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IDA DOCUMENT D-1152

A REFERENCE MANUAL FOR THE EGYPTIAN DEFENSE FORCES COST MODEL

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July 1992

Prepared for
Office of the Assistant Secretary of Defense
(Program Analysis and Evaluation)

INSTITUTE FOR DEFENSE ANALYSES
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UNCLASSIFIED

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	July 1992	Final Report, Feb 1991 - July 1992

4. TITLE AND SUBTITLE
A Reference Manual for the Egyptian Defense Forces Cost Model

5. FUNDING NUMBERS
C-MDA-903-89C-0003
T-Q7-911

6. AUTHOR(S)
James L. Wilson and Joseph-Paul Wilusz

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Institute for Defense Analyses
1801 N. Beauregard Street
Alexandria, VA 22311-1772

8. PERFORMING ORGANIZATION REPORT NUMBER
IDA-D-1152

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
OASD(PA&E)
Room 2D311, The Pentagon
Washington, D.C. 20301

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12A. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited.

12B. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The Egyptian Defense Forces Cost Model is a program created by IDA for estimating total investment and operating costs of alternative structures for Egyptian defense forces. Using actual 1991 costs and characteristics as a baseline, the model projects annual costs through 1998. The manual serves as both a user's guide and a maintenance manual for the model.

14. SUBJECT TERMS
Cost Models, Cost Estimates, Military Forces (Foreign), Egypt

15. NUMBER OF PAGES
128

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	SAR

NSN 7540-01-280-5500

Standard Form 298 (Rev 2-89)
Prescribed by ANSI Std 239-18
298-102

UNCLASSIFIED

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Contract MDA 903 89 C 0003
Task T-Q7-911

PREFACE

This document was prepared by the Institute for Defense Analyses (IDA) for the Office of the Assistant Secretary of Defense (Program Analysis and Evaluation), under contract MDA 903 89 C 0003, Task Order T-Q7-911, issued 24 January 1991. The objective of the task was to develop a model for estimating the effects on cost of changes to the composition and readiness of the Egyptian National Defense Program. This document serves as the reference manual for the model.

This document was reviewed within IDA by Paul F. Goree.

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I. INTRODUCTION

A. OVERVIEW OF THE MODEL

The Egyptian Defense Forces Cost Model is a dBASE III+ program that estimates the total investment and operating costs of alternative structures for Egyptian defense forces. Force structure alternatives are defined by:

- an equipment modernization plan,
- a force structure described by quantities of the major equipment,
- manning levels in the units,
- peacetime training rates of the units, and
- war-fighting sustainability objectives.

The cost model uses actual 1991 costs and characteristics as a baseline. Using these characteristics and the force structure obtained from an effectiveness data base, the model projects annual costs through the year 1998.

The model was developed in parallel with a force effectiveness model. The cost model compliments the effectiveness model by providing the capability to estimate the cost of alternatives directly from the databases used to make effectiveness assessments.

The cost model contains tables of standard cost factors, as well as information on manning practices, and operating tempos (optempos) derived from 1991 budget data. When building a new cost alternative from a database that was used for an effectiveness analysis, cost data and characteristics contained in the baseline reference tables are automatically linked to the corresponding forces. Once the force structure information is imported from a capability assessment forces database, the cost model operates independently of the effectiveness model.

The model internally stores and calculates information in terms of constant price levels (i.e., 1991 prices). An escalation and price growth table for pay, local currency, foreign currency, and FMS (foreign military sales)[1] procurement is used to present reports in both constant and future-year actual costs.

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[1] Recently the expression foreign military sales (FMS) has been replaced by foreign military funds (FMF). The term FMS is used in this manual.

Each cost alternative is independent from all others. Procurement quantities, unit procurement costs, unit and equipment quantities, manning practices, training rates, sustainability objectives, and cost factors may be changed in one alternative without affecting any other alternative. The model allows a user to examine and modify every aspect of an alternative and recalculate the costs at any time. You may switch from working on one alternative to another at any time. To save disk storage space, you have the option to compress all alternatives other than the one you are currently using. After you create an alternative, the reports function of the model provides a variety of summary and detail reports to document both the assumptions and cost estimates.

B. CONTENTS OF THE REFERENCE MANUAL

This reference manual has six sections and three appendices, the contents of which are summarized below.

- Section I, **Introduction**, provides a general overview of the model structure and estimating relationships, gives instructions on installing the model, and explains the terminology and labels encountered in the model.
- Section II, **Cost-Estimating Methodology**, describes the methods used to estimate the costs of each alternative, including the basic formulas used to calculate each part of the total estimate.
- Section III, **Data Structure**, describes how information on units and equipment, manning, optempos, and cost factors are represented throughout the model. It also explains the relationships between the data structures and the calculations used to estimate costs.
- Section IV, **Using the Model**, explains the concept of operations from the user's perspective. It provides the user with step-by-step instructions for using each feature of the model.
- Section V, **Model Maintenance**, outlines the procedures and methods that are used to change the imbedded model parameters.
- Section VI, **Databases**, provides information concerning the databases used with the model. This section is for the user who wants a more in-depth understanding of the way in which data are stored and retrieved in the model and the relationships between the various databases.
- **Appendix A** contains listings of the structures of each type of database.
- **Appendix B** contains "procedure trees" that show the hierarchy and order of operation of the dBASE procedures and their relationships to the menu structure of the model.

- **Appendix C** contains the unit procurement costs used to calculate the costs of the modernization program, inflation and price growth assumptions.

We recommend that every user read Sections I and IV. Those who want to understand the mechanics of the model should read Sections II and III. Sections V and VI and the appendices are intended for those who will maintain the model and update the cost factors.

C. MODEL STRUCTURE AND COST-ESTIMATING RELATIONSHIPS

Within the cost model, the Egyptian defense budget is divided into five separate categories:

- **Unit Peacetime Operations:** Costs incurred through the operation of forces in peacetime training and other day-to-day activities.
- **War Reserve Materiel (WRM) Investment:** Costs incurred to build stockpiles of supplies for the initial days of wartime operations
- **Foreign Military Sales (FMS) Modernization:** Costs associated with the acquisition of weapon systems, military equipment, facilities, and other major support systems using FMS credits.
- **Projects:** Costs incurred in one-time activities such as the construction of facilities, procurement of equipment with local or foreign currency, or other significant efforts that are not exclusively FMS projects.
- **Fixed Costs:** Costs that are essentially independent of future decisions affecting force size, equipment mix, unit manning, training levels, and war reserve objectives. Fixed costs include FMS cases signed in prior years that must be paid during the planning period as well as Ministry of Defence (MoD) operating costs not tied to force size.

The cost estimates in each category are a function of different cost drivers. Peacetime operating costs are related to the force structure and equipment inventories. Operating costs are made up of several components and each component is estimated differently. Pay and indirect personnel costs are affected by manning practices. Fuel, spare parts, and training munitions costs are functions of unit training (optempo). WRM costs are dependent on changes in forces and equipment as well as the WRM objective for each type of unit and equipment. Where applicable, the cost model estimates costs separately for Egyptian pounds (LE), hard currency (HC), and FMS credits. Table I-1 summarizes the types of funding and cost drivers for each of these categories.

Table I-1. Cost Model Scope and Relationships

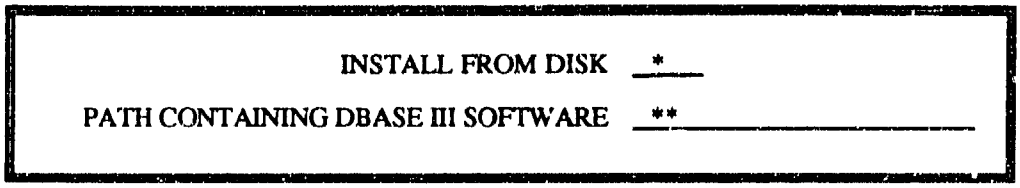
	Funding			Cost Drivers			
	LE	HC	FMS	Quantity and Type of Unit/ Equipment	Manning per Unit	Optempo for the Unit/ Equipment	WRM Objective
FMS Modernization							
			X	Deliveries by year and unit costs or funding profile			
Unit Peacetime Operations							
Pay	X			X	X		
Indirect Personnel Support	X	X		X	X		
Fuel	X			X		X	
Spare Parts	X	X	X	X		X	
Munitions	X	X	X	X		X	
Fixed Operating Support	X	X	X	X			
War Reserve Materiel							
Fuel	X			X			X
Spare Parts	X	X	X	X			X
Munitions	X	X	X	X			X
Projects							
	X	X	X	Project funding profile			
Fixed Costs							
MoD Non-Combat Costs	X	X		FY 1991 Budget/Costs			
Signed FMS Case Costs			X	Signed FMS case payment profile			

D. INSTALLING THE MODEL

The model operates on any personal computer that runs dBASE III+ from its hard disk and has two megabytes of hard-disk storage space. The model requires two subdirectories. The COSTMDL subdirectory is created directly under the subdirectory that contains the dBASE III+ software. This subdirectory contains all of the cost model procedures and the databases associated with specific cost alternatives. The second subdirectory required, named BASELINE, contains the baseline reference tables used to build new cost alternatives and databases that apply to every cost alternative.

The dBASE procedure named INSTALL creates the required subdirectories and installs the correct files under each subdirectory. (Note: If the subdirectories already exist, new ones are not created. The current version of each procedure is copied over existing files. The following steps will result in the successful installation of the model:

1. From the DOS prompt, start the dBASE III+ program in whatever manner you normally use.
2. Assuming the COST MODEL floppy disk is in the A drive, run the cost model installation procedure as follows from within dBASE: type **do a:install** and press RETURN.
3. The installation procedure will ask for two pieces of information:



* Enter the drive letter (e.g., A, B, etc.) where you have placed the floppy disk containing the cost model software.

** Enter the full path (e.g., C:\DBASE3, C:\DB3, D:\APPS\DBASE, etc.) where you have installed the dBASE III+ software and press RETURN.

4. After entering these responses, you have three choices:

   B to begin (all of the data shown on the screen are correct)

   F to fix an answer (something was typed incorrectly)

   C to cancel the installation

When installation is complete, the introductory cost model screen is displayed. Press the F10 function key to begin.

E. MODEL CONVENTIONS AND LABELS

Standard conventions have been adopted and are used in screen displays and printed reports produced by the model. The following paragraphs describe the conventions used to describe types of currency, to represent fiscal years, to distinguish constant and future-year prices, and to scale the numeric data.

1. Currency Conventions

The cost model stores, calculates, and displays funding requirements for Egyptian pounds, hard currency, and FMS credits. Within this manual, Egyptian pounds are

referred to as either "Egyptian pounds" or "local currency," but the designation "LE" is used in the screen displays and reports produced by the model. The terms "hard currency" and "foreign currency" are often used interchangeably. Throughout the manual, we use the term "hard currency." The cost model uses "HC" for this type of funds. Hard currency is denominated in U.S. dollar equivalents. Recently the expression foreign military sales (FMS) has been replaced by foreign military funds (FMF). The term FMS is used in this manual. FMS credits are referred to simply as FMS funds or dollars and the label "FMS" designates this type of funds in the model.

2. Fiscal Year Conventions

Funding for a specific year is normally indicated with "FY" or "F" followed by the last two digits of the year (e.g., FY91 or F91 for fiscal year 1991). Sometimes funding for multiple currencies is indicated by the currency abbreviation followed by the last two digits of the year (e.g., LE91, HC96, or FMS94). Manpower data are labeled with "OFF," "NCO," and "CON" for officers, non-commissioned officers, and conscript enlisted personnel. Sometimes these labels are used with the year to represent values in specific years (e.g., OFF91, NCO94, CON97).

3. Constant and Future-Year Price Conventions

Cost data are often presented in both constant and future-year values. The designation "FY91'$" is used to indicate funding in constant 1991 prices. "TY$" is used to designate then-year or future values.

4. Numeric Scaling

Funding data is displayed in thousands or millions. The symbol "000s" indicates a value that has been divided by one thousand. Thus, any numbers that are accompanied by the symbol "000s" should be read as if multiplied by one thousand (e.g., 12 (000s) is in reality 12,000). In other instances, data tables are displayed and reports are printed in millions. These are labeled in the table or report header as being in millions. Quantities of units and equipment and manpower data are not scaled.

5. Computer Interface Conventions

We have adopted the following conventions for explaining the use of the model.

- The names of specific keyboard keys appear in small capital letters. For example, the key labeled with the word "return" is shown as RETURN. (Some

keyboards use the label "enter" rather than "return." In this manual, RETURN refers to either the RETURN or ENTER key. The keys labeled with arrows (UP ARROW, DOWN ARROW, LEFT ARROW, and RIGHT ARROW) are referred to collectively as the ARROW keys.

- Text you are to type is shown in bold. For example, if you are to type the word "cost", the instructions will tell you to type **cost**. (Unless otherwise indicated, it does not matter whether you type in capital or lower case letters.)
- Options, instructions, and other forms of text that appear on the screen are shown in Courier typeface. For example, an option that appears on the screen called "FMS Program Data" will be shown as `FMS Program Data`.

II. COST-ESTIMATING METHODOLOGY

The previous section described the general cost model structure and the basic cost-estimating relationships. This section describes the methods and formulas used to calculate the costs of the modernization program, peacetime operating costs, and WRM sustainability costs for each alternative. The section concludes with a brief description of the Projects module and an explanation of the procedures used to estimate fixed costs.

A. FMS MODERNIZATION COSTS

The FMS modernization portion of the model estimates the costs of system procurements and other modernization programs funded with FMS credits. To reduce the effort required to estimate the costs of modernization, the cost model contains a baseline database with the procurement unit costs of many potential modernization programs. The model creates a unique and independent copy of the modernization programs list for each alternative. Users may expand the list or revise delivery schedules and unit costs to tailor the characteristics of each specific alternative. If an existing cost alternative is being *recreated* to match new data in a revised forces database, the cost model provides you the capability to use the previously defined modernization program or to begin again with the baseline.

The modernization portion of the cost model represents programs by their unit procurement or total program cost. Programs for systems whose procurement costs are determined by the number of items delivered (e.g., aircraft, ships, tanks) have an estimated unit procurement cost. Other programs have the unit procurement cost set at zero and instead have a specific annual funding stream that represents the total cost of the program by year.

All programs in an alternative's modernization database have a status as either an *included* or an *excluded* program. Initially, each program has its status set to excluded. When you change the status to included, it indicates that a specific modernization program is now part of an alternative's cost. Calculations of the total costs of an alternative ignore programs marked as excluded. You may change the included and excluded status of each modernization program at any time.

Where a program's cost is a function of procurement quantities, the model permits you to modify the annual delivery quantities to fit the alternative. FMS modernization programs whose costs are not dependent on a procurement quantity, such as Workshop Improvements or Training Center Upgrades, require that you enter year-by-year funding requirements directly into the model.

Where the FMS modernization cost estimate is based on the quantities being delivered, the estimate equals the product of the total quantity delivered and the unit cost of that item:

$$PC_X = UC_X * Q_X ,$$

where:

PC_X = the total procurement cost of program X for all years in FY 1991 dollars,

UC_X = the cost of one delivered unit of program X in FY 1991 prices, including all administrative charges, initial spares, and support equipment, and

Q_X = the total quantity of program X procured.

The unit costs used by the model are approximately 20 percent higher than Department of Defense (DoD) unit procurement costs. The higher FMS unit costs cover the costs of program management, initial spares procurement, support equipment, research and development, operational testing, and other acquisition-related costs that accompany this form of procurement. These additional costs are sometimes not included in reports of DoD procurement costs, but must be included in an FMS procurement.

Unit procurement costs and the initial calculations are in 1991 prices. The model converts these constant-dollar estimates to then-year prices for reports and cost summaries. Whenever more current information is available for a program, users have the ability to modify the unit cost used within an alternative.

Major system procurements typically require progress payments over several years. Because the exact payment arrangements vary from program to program, the cost model approximates the time-phased funding requirements based on the type of system procured. Each program in the baseline modernization database has a corresponding payment profile. The estimating procedures spread procurement costs over a number of years, up to three years prior to the actual delivery year. Table II-1 shows a simple example of how payments are spread. Table II-1 uses a unit cost of $10 and a payment profile consisting of 10 percent two years before delivery, 30 percent one year before delivery, and 60 percent in the year of delivery.

Table II-1. Advance Payments for FMS Procurements

	Year 1	Year 2	Year 3
Quantity Delivered	—	—	10
Payments Required[a]	10	30	60

[a] Payments calculated on the basis of a unit cost of $10 per item.

Modernization programs often contain deliveries of weapon systems over several years. To incorporate the effects of the advance payment requirements and the possibility of deliveries at any time during the planning period, the cost model calculates the year-by-year modernization costs in two steps. First, it calculates the total cost for each year as if all payments were due in the delivery year, and then it spreads these costs to the appropriate prior years. The estimating process adds overlapping advance payments when deliveries occur over multiple years.

You may change the unit cost, delivery schedule, payment profile code, and include/exclude status indicator of each modernization program. Changes made to any of these values affect only the cost alternative in which you are currently working. Appendix C contains the unit procurement costs installed in the baseline version of the model and a table of payment profiles used in the cost model.

For those programs represented in terms of a specific sequence of annual funding requirements, the year-by-year values may be entered in either constant FY 1991 prices or in the actual costs anticipated each year (future prices). The cost model makes any necessary conversions and stores the data in constant FY 1991 prices using price deflators contained in a baseline table.

B. PEACETIME OPERATING COSTS

Peacetime operating costs provide for personnel support and equipment operations. Within the cost model, operating costs are the sum of pay, indirect personnel support, fuel, spare parts other than initial spares, training munitions, and fixed operating support (FOS). These costs are determined by the amounts and types of equipment, manning practices, and peacetime optempo.

Pay and indirect personnel costs are a function of total service manning calculated from manning factors and the number of units and quantities of equipment in the force each year. The costs for fuel, spare parts, and training munitions depend upon unit operating rates and the number of units and the quantities of equipment units possess each year. FOS costs depend only on the number of units or quantities of equipment. Funds for peacetime

operating costs can be any combination of local currency, hard currency, or FMS credits, depending on the type of resource and the kind of equipment being used.

In summary, peacetime operating cost estimates fall into three broad categories:

- Costs related to manning
  - Pay
  - Indirect Personnel Support
- Costs related to optempo (i.e., peacetime training rates)
  - Fuel
  - Spare Parts
  - Training Munitions
- Costs related to neither manning nor optempo
  - Fixed Operating Support

Table II-2 contains the equations used to calculate peacetime operating costs.

Table II-2. Formulas for Estimating Peacetime Operating Costs

(1)	$Pay_{x,s,t,yr}$	=	$U/E_{x,yr}$	* $M_{x,yr}$	*	$Pay_{s,t}$
(2)	$Indirect\ Support_{x,s,t,yr}$	=	$U/E_{x,yr}$	* $M_{x,yr}$	*	$Ind_{s,t}$
(3)	$Fuel_{x,yr}$	=	$U/E_{x,yr}$	* $Op_{x,yr}$	*	$Fuel_x$
(4)	$Spare\ Parts_{x,f,yr}$	=	$U/E_{x,yr}$	* $Op_{x,yr}$	*	$Spr_{x,f,yr}$
(5)	$Training\ Munitions_{x,f,yr}$	=	$U/E_{x,yr}$	* $Op_{x,yr}$	*	$Mun_{x,f}$
(6)	$Fixed\ Operating\ Support_{x,f,yr}$	=	$U/E_{x,yr}$	* $FOS_{x,f}$		

where:

$U/E_{x,yr}$	=	number of units or pieces of equipment of type x in fiscal year yr
$M_{x,yr}$	=	manning per unit or per item of equipment of type x in fiscal year yr
$Op_{x,yr}$	=	peacetime training rate per year for unit or equipment type x in fiscal year yr
$Pay_{s,t}$	=	average annual pay per year in service s for personnel type t (i.e., officer, NCO, conscript)
$Ind_{s,t}$	=	MoD-wide average indirect support cost per year in service s for personnel type t (i.e., officer, NCO, conscript)
$Fuel_x$	=	cost of fuel per unit of peacetime training for unit or equipment type x
$Spr_{x,f,yr}$	=	cost of spare parts per unit of peacetime training for unit or equipment type x for funding type f (i.e., Egyptian pounds, foreign currency, or FMS credits) in fiscal year yr
$Mun_{x,f}$	=	cost of training munitions per unit of peacetime training for unit or equipment type x for funding type f (i.e., Egyptian pounds, foreign currency, or FMS credits)
$FOS_{x,f}$	=	annual fixed cost to support a unit or piece of equipment of type x for funding type f (i.e., Egyptian pounds, foreign currency. or FMS credits)

1. Operating Costs Related to Manpower

Both pay and indirect personnel support costs depend on the total number of personnel. The model calculates the total manpower by service for each type of unit and equipment (the $U/E_{x,yr} * M_{x,yr}$ part of Equations 1 and 2 in Table II-2), sums these individual totals for each service, and multiplies the sums by pay and support factors.

The total manpower calculation is made from the manpower database associated with each alternative. The manpower database has an entry for every unit and equipment type represented in the forces database for the alternative. The manpower database contains manning factors for officers, NCOs, and conscripts that are initially assigned from the baseline factors table. Depending on the data available, the manning for an entire unit may be assigned at the unit level, the equipment level, or a combination of unit and equipment manning factors. Each alternative's manpower database contains separate entries for each year of the planning period, and users may adjust these factors to estimate the cost of changes in manning practices. More information on the structural aspects of the model is in Section III, Data Structure.

a. Pay

The model calculates pay costs based on the total number of officers, NCOs, and conscripts in each service in each fiscal year. All pay costs are in Egyptian pounds. The estimating process uses Equation 1 in Table II-2 to estimate these pay costs. The calculation is a three-step process:

- Multiply the quantities of units or equipment by officer, NCO, and conscript manning factors. The results are stored as the total manning for each unit or equipment entry in the manpower database of each alternative.
- Sum the total officer, NCO, and conscript manning for each service.
- Multiply the service manning totals for officers, NCOs, and conscripts by the annual pay rates.

Appendix C shows the pay rates used in the cost model baseline. Users may change these rates within a single alternative or in the baseline factors table.

b. Indirect Personnel Support

Indirect personnel support costs are the estimated amounts spent per person for rations, clothing, medical care, housing, personnel administration, and base support. The estimating procedures calculate indirect personnel support costs at an MoD-wide level. The

basic formula used for these calculations is Equation 2 in Table II-2. Indirect personnel support costs are the product of the total number of MoD personnel in each fiscal year and the cost factors for each of the indirect support areas.

The model has separate indirect personnel support cost factors for officers, NCOs, and conscripts and includes both Egyptian pound and foreign currency factors. Appendix C contains a table showing the cost factors in the baseline and the MoD total indirect support costs used to create the factors. These baseline cost factors assume that the indirect support factors for officers, NCOs, and conscripts, are the same. Users may modify the indirect support factors within each alternative or in the baseline cost factors table to reflect different factors for different personnel categories.

2. Operating Costs Related to Peacetime Training Levels

Fuel, spare parts, and training munitions costs all depend on the peacetime training levels, or optempo, of individual units. The model calculates the total optempo for each type of unit and equipment (the $U/E_{x,yr} * Op_{x,yr}$ part of Equations 3, 4, and 5 in Table II-2), and multiplies the totals by a factor for fuel, spare parts, or training munitions.

Just as each alternative has a manpower database, so does each alternative have its own optempo database with an entry for every unit and equipment represented in the forces database of an alternative. The optempo database contains optempo factors initially assigned from the baseline factors table. Depending on the data available, the optempo-driven costs are calculated at the unit level, the equipment level, or a combination of unit and equipment levels. Each alternative's optempo database contains entries for each year of the planning period. Users are able to adjust these factors and calculate the costs of changes in peacetime training practices. More information on the structural aspects of the model is in Section III, Data Structure.

a. Fuel

Peacetime training levels, numbers of units, quantities of equipment, and fuel cost factors ($Fuel_x$) combine to estimate total MoD fuel costs (see Equation 3 in Table II-2). The fuel cost factor is the cost of fuel consumed by each unit or equipment item for one increment of optempo. For example, a fuel factor of 500 LE for an F-16, is the fuel cost of one flying hour for one F-16. The number of units or equipment in each fiscal year is multiplied by the optempo for that type of unit or equipment for the same fiscal year to find the total annual level of peacetime operations for each element of the force structure. Fuel

costs in each year are then equal to the product of total peacetime operations and the cost of fuel per unit of training for each unit or equipment type.

b. Spare Parts

The level of peacetime operations and spare parts cost factors ($Spr_{x,f,yr}$) combine to estimate costs for spares (see Equation 4 in Table II-2). The spare parts cost factor represents the cost of spare parts for one unit or one item of equipment *per unit of training time*. Since spare parts can be funded with any combination of local currency, foreign currency, or FMS credits, the spare parts cost factors database for each alternative has separate entries for each unit/equipment type and all three funding types in each year. The model contains separate cost factors for each year and each funding type to permit the transition from FMS or foreign currency funded support to local Egyptian production. The process that creates new cost alternatives copies the baseline cost factors for FY 1991 into the spare parts cost factors for all years. The model allows users to change these spare parts cost factors.

c. Training Munitions

The costs of training munitions are the product of peacetime operations and the munitions cost factor ($Mun_{x,f}$) (see Equation 5 in Table II-2). For each type of unit/equipment, there is a separate munitions cost factor for each source of munitions production—Egyptian pounds for domestic production and foreign currency or FMS credits for other purchases. Each unit and equipment type may have munitions factors in any combination of funding types.

3. Fixed Operating Support

The FOS cost factor provides a means of representing fixed annual support costs. Although this factor can be used for units or equipment, it is primarily intended for units that have costs that are not dependent on manning levels or optempos. The costs calculated for FOS are the product of the number of units/equipment and the FOS cost factor for each type of unit (see Equation 6 in Table II-2). Separate FOS factors are available for each funding type—Egyptian pounds, foreign currency, and FMS credits.

C. WAR RESERVE MATERIEL COSTS

Investments in War Reserve Materiel (WRM) provide stockpiles of supplies to be used in the initial days of a conflict. Additional WRM investment costs occur whenever the number of major weapon systems in the Egyptian defense force increases or when the

number of days of wartime operations to be supported from reserves increases. WRM investment costs are driven by year-to-year changes in the product of unit/equipment quantities and the WRM objective.

The cost model considers three categories of WRM supplies, fuel, munitions and spare parts. Fuel is acquired with Egyptian pounds. Munitions and spares are acquired using any combination of Egyptian pounds, foreign currencies, or FMS credits. The model baseline assumes all units and equipment types have an initial support level of eighteen days of wartime operations. The process that creates new alternatives assigns this same WRM objective to each new equipment item that enters the force.

In any year, the total WRM requirement for a type of unit or equipment is the product of the total number of units or items of equipment of that type and the days of supply required in that year. An increase in the total requirement, relative to the previous year, causes the model to add WRM costs to the estimate. The year-to-year differences in total WRM requirements and the cost per day of wartime operations determine the WRM costs.

Generally, the MoD cannot use spare parts and munitions stockpiled for specific systems after that system leaves the inventory. For this reason, the model does not generate a spares or munitions credit as the total WRM requirement decreases for a type of unit or equipment. Fuel, however, is not system-specific and can be used for most systems. The model allows for this residual value of fuel stockpiles and calculates a credit for WRM fuel whenever the total WRM requirements decrease.

The model calculates WRM costs for each type of unit and many major weapon systems. The estimating process includes WRM equipment costs for Army Armored Personnel Carriers (APCs), howitzers, and tanks. Air defense WRM equipment costs are only estimated for new U.S. systems. Air Force WRM equipment costs include all major new combat or combat support aircraft types. Navy WRM equipment costs include both ships and aircraft. The model is capable of including costs for any type of unit or equipment, as long as appropriate costs per day of supply are known. It is important to ensure that, when WRM costs are represented for both equipment and units of that equipment type, the factors are independent and do not double-count costs.

The formula for estimating WRM costs is:

$$\text{WRM Cost} = \{[(U/E_x * DoS)_{yr2} - (U/E_x * DoS)_{yr1}] * \text{CostperDay}\},$$

where:

U/E_x = number of units of type X or pieces of equipment of type X,

DoS = total days of supply desired on hand, and

CostperDay = cost per day of war for a supply type.

The number of units or equipment items in the force is transferred to the WRM database directly from the forces database of each alternative. Each of the three WRM supplies, fuel, munitions, and spare part, have separate cost factors. Table II-3 contains a hypothetical WRM example.

Table II-3. Hypothetical WRM Example

	1991	1992	1993	1994	1995	1996	1997	1998
Number of Units/Equipment Items	10	10	15	15	15	10	0	0
Days of Supply Objective	10	11	11	12	12	12	12	12
Total Requirement	100	110	165	180	180	120	0	0

Note: Cost per day of wartime operations is 100.

In 1991, the MoD has enough WRM for 10 units for 10 days of wartime operations. In 1992, this objective increases to an average of 11 days for all units. The cost for this increase in the objective is:

$$\begin{aligned} \text{WRM Cost}_{92} &= 100_{\text{per day}} * [(10_{\text{units}} * 11_{\text{DoS}})_{92} - (10_{\text{units}} * 10_{\text{DoS}})_{91}] \\ &= 100 * (110 - 100) \\ &= 1{,}000 \end{aligned}$$

In 1993, the number of units increases by five while the sustainability objective remains at 11 days. The costs are:

$$\begin{aligned} \text{WRM Cost}_{93} &= 100_{\text{per day}} * [(15_{\text{units}} * 11_{\text{DoS}})_{93} - (10_{\text{units}} * 11_{\text{DoS}})_{92}] \\ &= 100 * (165 - 110) \\ &= 5{,}500 \end{aligned}$$

In 1994, the objective again increases by one day. Because the number of units and DoS in 1994 are greater than in 1992, the WRM costs are higher in 1994 than in 1992.

$$\begin{aligned} \text{WRM Cost}_{94} &= 100_{\text{per day}} * [(15_{\text{units}} * 12_{\text{DoS}})_{94} - (15_{\text{units}} * 11_{\text{DoS}})_{93}] \\ &= 100 * (180 - 165) \\ &= 1{,}500 \end{aligned}$$

In 1996, the force changes from 15 to 10 units. If the WRM supply being estimated is fuel, the model generates a credit to the total funding requirement. Assuming the supply is fuel, the credit would be:

$$\begin{aligned}\text{WRM Fuel Cost}_{96} &= 100_{\text{per day}} * [(10_{\text{units}} * 12_{\text{DoS}})_{96} - (15_{\text{units}} * 12_{\text{DoS}})_{95}] \\ &= 100 * (120 - 180) \\ &= -6{,}000\end{aligned}$$

D. OTHER PROJECTS

The Projects portion of the cost model provides a means to record costs that are not part of FMS modernization, peacetime operations, or WRM sustainability investment. Two general examples of what typically would be incorporated under the projects module are construction projects and procurement of equipment with Egyptian pounds from domestic sources or with hard currency from non-Egyptian sources. Users enter project data as specific annual funding profiles in any combination of Egyptian pounds, hard currency, and FMS credits. These values are then incorporated directly into the total estimate. No calculations are performed.

E. FIXED COSTS

The MoD incurs some costs in normal day-to-day operations that are insensitive to the size of the force. The model includes these costs as fixed costs of operations. They are based on FY 1991 MoD budget data provided by the Egyptian MoD. The model includes this same level of fixed costs throughout the planning period.

The model also treats previously signed FMS cases as fixed costs even though the total changes from year to year. The FY 1992 to FY 1998 payment schedule for signed cases was provided by the Defense Security Assistance Agency (DSAA) and was current as of January 27, 1992. Provisions exist to revise these costs periodically.

F. INFLATION AND PRICE CHANGES

The cost model performs its calculations and stores results only in constant FY 1991 prices. Many reports and displays show escalated future-year costs as well as the constant FY 1991 value. To convert constant prices to then-year estimates, the model uses a table of escalation values. These initial inflation and price growth factors are shown in Appendix C.

The model contains separate provisions for price escalation rates for military pay and general Egyptian inflation. Currently these two rates are the same. When pay escalates at a rate different from the overall Egyptian economy, the true pay rate expressed in constant dollars changes. To account for possible differences in the pay and general economy price escalators, the model internally adjusts the 1991 baseline rates in all pay computations.

III. DATA STRUCTURE

The cost model combines information on force structure, manning, and peacetime training to estimate the total cost of alternative structures for Egyptian defense forces. The representation of units and equipment that make up the force structure is the foundation for understanding how the cost model works. This section describes the structure of the forces and equipment, manning, operating rates, and cost factor data. Virtually everything in the model builds on this structure.

A. REPRESENTATION OF FORCES AND EQUIPMENT

The model represents organizations in a hierarchical structure within each of the military services. The first level of the hierarchy within each service represents the major types of units—types of divisions and separate brigades in the Army, regiments in the Air Defense forces, and brigades in the Air Force and Navy. Table III-1 shows the major unit types used in the initial application of the cost model to the Egyptian force structure.

Most major Army unit types have subordinate units, and units at all levels have equipment. Operational units show the types and quantities of major equipment assigned to them. Army divisions and subordinate units list tanks, APCs, and howitzers. Air Force brigades show each type of aircraft assigned to them. Air Defense regiments show specific missile, gun, and radar types. Naval units list all ships and boats. These are obviously not all of the equipment types in the Egyptian defense forces. Rather, they are the major types of equipment associated with significant operational costs. Table III-2 illustrates the model's representation of forces and equipment with an example from each service.

As mentioned previously, the cost model is able to use different representations of a service's organizational structure and equipment inventory. Costs, however, cannot be estimated for units and equipment types that are not included in the representation. Resource and cost characteristics can be entered for any unit or equipment contained in the force representation. For example, if a critical portion of a cost study will be evaluating the cost effects of changing manpower practices at the brigade level, the force structure in the model must include brigades and manning factors for those brigades. If the analysis will also estimate the costs of different training levels for aircraft, the force representation must include the various aircraft equipment types.

Table III-1. Major Unit Types of Egyptian Forces

Army	Air Defense Forces
Western Armor Divisions	Amoun Brigades
Eastern Armor Divisions	Hawk Air Defense Brigades
Western Mechanized Divisions	Mixed Air Defense Brigades
Eastern Mechanized Divisions	Chaparral Air Def Regiments
Infantry Divisions	SelfPropel Missile Brigades
Separate Brigades	Crotale Brigades
	Radar Air Defense Brigades
	Air Def Artillery Regiments
Air Force	**Navy**
Fighter Brigades	Submarine Brigade
Fighter/Bomber Multi-Brigades	Destroyer Brigade
Training Brigades	Traffic/Artillery Brigade
Combat Helicopter Brigades	Middle Rocket Brigade
RECCE/Warning Brigades	Small Rocket Brigade
RPVS/Drone Brigades	Sweeper Brigade
Transport (Fixed Wing) Brigades	Transport Brigade
Transport (Helicopter) Brigades	Fast Boat Brigade
	Rescue/Supply Brigade
	Sniper Brigade
	Traffic Group
	Naval Aviation Brigade
	Shore Artillery Brigade
	Shore Rocket Brigade
	RECCE/EW Brigade

The hypothetical Air Force example in Table III-3 (a subset of Table III-2) illustrates how the model represents fighter brigades in the Air Force.

The example in Table III-3 shows that the Air Force has four fighter aircraft brigades in year one, three F-4E brigades, and one F-16 brigade. In year 2, the number of brigades decreases to three, one F-4E brigade and two F-16 brigades. In year 3, there are still three brigades but they are now all F-16 brigades. Each level of indenture in the table represents a different level of hierarchy in the Air Force:

- Service-wide Activities: In addition to fighter aircraft and other combat brigades, the Air Force has many organizations that support the entire service. The manning for all organizations that provide Air Force-wide support and even small units not included in the detailed force breakout would have their

Table III-2. Multi-Level Representation of Forces and Equipment

Units and Equipment	Year 1	Year 2	Year 3
LAND FORCES	1	1	1
West Armor Div General	1	1	1
Armor Division (West)	2	2	3
M113A2	*10*	*10*	*15*
M60A3 MDM	*6*	*6*	*9*
Armor BDE (West)	4	4	6
M113A2	*100*	*100*	*150*
M60A3 MDM	*120*	*120*	*180*
Mechanized BDE (West)	2	2	3
M113A2	*60*	*60*	*90*
M60A3 MDM	*50*	*50*	*75*
Artillery BDE	2	2	3
M-109A1	*30*	*30*	*45*
AIR DEFENSE FORCES	1	1	1
Hawk AD BDEs	1	1	1
Hawk AD BDE	4	41	
Hawk	*48*	*48*	*12*
I-Hawk AD BDE	0	0	3
I-Hawk/PIP III	*0*	*0*	*36*
AIR FORCE FORCES	1	1	1
Fighter BDEs	1	1	1
F-4E BDEs	3	1	0
F-4E	*144*	*48*	*0*
F-16 BDEs	1	2	3
F-16A	*32*	*32*	*32*
F-16C	*0*	*32*	*64*
NAVAL FORCES	1	1	1
Destroyer BDE	1	1	1
DD Z-28	*1*	*1*	*2*
FF Black Swan	*3*	*3*	*1*

Note: Quantities shown are for illustration only.

Table III-3. Example of Units and Equipment in the Model

	Units and Equipment	Year 1	Year 2	Year 3
a	**AIR FORCE**	1	1	1
b	**Fighter BDEs**	1	1	1
c	**F-4E BDEs**	3	1	0
d	*F-4E*	*144*	*48*	*0*
e	**F-16 BDEs**	1	2	3
f	*F-16A*	*32*	*32*	*32*
g	*F-16C*	*0*	*32*	*64*

manning and operating costs represented against this line. The "1"s on line *a* cause the model to include the Air Force-wide manning and operating costs each year.

- Major Unit Types: Line *b* is used to include any indirect costs associated with activities that support fighter brigades in general, independent of the number of brigades or aircraft in each of the three years. If there were fighter aircraft workshops (depots), fighter aircraft headquarters, or other support activities associated with just fighter aircraft, their costs would be included against this line in the other databases.
- Operational Units: Lines *c* and *e* show the number of F-4E and F-16 brigades in each year and permit calculation of brigade-level costs not dependent on the amount or type of equipment. Any brigade manning and operating costs that are not affected by the number of aircraft assigned to the brigade would be included against this entry.
- Equipment: Lines *d*, *f*, and *g* show the quantities of F-4Es, F-16As, and F-16Cs in each type of brigade. The forces on these lines are used to calculate manpower totals and costs dependent on the number of aircraft in the brigade each year. Note that the quantities of equipment shown represent the total number found in each type of brigade. Three F-4E brigades have a total of 144 F-4Es, and one F-16 brigade has 32 F-16As in the first year.

Data in the forces database for an alternative originates from the database used to operate the effectiveness model designed for the joint U.S./Egyptian security assistance review. The effectiveness database is similar to the cost model forces database but more complex. The effectiveness database contains an entry for every specific unit and every type of equipment used to calculate an effectiveness score. The cost model filters out some types of Army equipment that do not have a major impact on operating costs, and provides the opportunity to condense the forces representation for the purpose of estimating costs. (See Section IV, Using the Model, for more details.) If the forces data are not condensed, each individual unit will transfer to the cost model representation of the force. In the example above, the three F-4 brigades would have been listed individually and each brigade would have had a line with 48 aircraft below it. Table III-3 shows the result when the condensed mode of building a new alternative is chosen. The only difference between the two modes is the size of the databases obtained and therefore the speed at which the cost model performs its calculations.

A table of baseline factors contains manpower, optempo, fuel, spare parts, training munitions, and fixed support cost factors by unit and equipment types. Whenever a new alternative is built from an effectiveness database, data from the baseline table are matched

with units and equipment to place the appropriate values in manpower, optempo, and cost factor databases that match the structure of the cost model forces database. The next three subsections describe how manpower, optempo, and cost factors are represented in these types of databases.

B. REPRESENTATION OF MANNING

For each entry in the force structure database there is a corresponding place to record officer, NCO, and conscript manning in the manpower database. Since the force structure is represented as service-wide activities, major units, operational units, and equipment, manning can be represented in a variety of ways depending on the data available and what the user believes causes changes in manning. An example of representing manning at multiple levels is illustrated using the hypothetical Air Force structure in Table III-4.

Table III-4. Alternative Representations of Manning Factors

	Alternative Representations of Manning Factors		
Unit or Equipment Type	Quantity Year 1	BDE Level	Unit and Equipment Level
AIR FORCE	1	300	300
Fighter BDEs	1		60
F-4E BDEs	3	300	104
F-4E	144		4
F-16 BDEs	1	300	124
F-16A	32		4
F-16C	0		4

Table III-4 shows two ways of representing manning in an Air Force with 1,500 officers. In the first representation (column labeled "BDE Level") there are 300 officers in Air Force-wide support activities and 300 in each of four brigades. This representation only calculates changes in total manning with the activation or deactivation of whole brigades. Changing the number of aircraft in the brigades would have no effect on Air Force manning. Alternatively, if some manning were thought to be related to the quantity of aircraft, manning factors would be included at the total Air Force level, the brigade (BDE) level, and the aircraft level. The column labeled "Unit and Equipment Level" shows manning factors represented to this level of detail. In either case, the sum of the products of the quantities and the individual factors totals 1,500.

Case 1:

1,500 = (1 Air Force) * 300 + (3 F-4 BDEs) * 300 + (1 F-16 BDE) * 300

Case 2:

1,500 = (1 Air Force) * 300 + (1 Fighter BDE) * 60 + (3 F-4 BDEs) * 104
+ (1 F-16 BDE) * 124 + (144 F-4s) * 4 + (32 F-16s) * 4

C. REPRESENTATION OF OPERATING RATES

In general, the operating rate (referred to as optempo) is the level of peacetime activity of a unit or item of equipment. Fuel, spare parts, and training munitions costs are calculated based on the optempo and the total number of units or items of equipment. (See Section II for a more detailed discussion of calculations.)

The model represents optempo in different ways depending on the type of unit or equipment and the available data. Some units and equipment items have easily measured levels of activity such as flying hours for aircraft, steaming days for ships, or field training hours for Army units. Whenever information at the specific levels was not available or appropriate, optempo was expressed as a percentage of the FY 1991 actual level. (Service-wide support activities are also represented in terms of the FY 1991 level of operations.) In these cases, setting the optempo to 100, for 100% of the FY 1991 level, produces the same cost per unit as occurred in FY 1991. Table III-5 illustrates how optempo is represented for the hypothetical Air Force example.

Table III-5. Representation of Optempo Levels in the Model

Unit or Equipment							
	Quantity			Optempo			
Type	Year 1	Year 2	Year 3	Measure	Year 1	Year 2	Year 3
Air Force	1	1	1	% FY91 level	100	105	105
Fighter BDEs	1	1	1	% FY91 level	100	110	110
F-4E BDEs	3	3	2	% FY91 level	100	110	110
F-4E	144	144	96	fhrs/ac/yr	180	200	200
F-16 BDEs	1	1	2	% FY91 level	100	110	110
F-16A	32	32	32	fhrs/ac/yr	180	200	220
F-16C	0	0	36	fhrs/ac/yr	180	200	220

Table III-5 shows the hypothetical Air Force with changes in optempo over three years. The table shows an increase in F-4 flying from year 1 to year 2 and increases in F-16 flying in each of the three years. There are also small increases in the Air Force-wide support level, the fighter brigade's major class level, and the F-4 and F-16 brigade levels. Aircraft flying optempo increases are in terms of flying hours per aircraft while the other changes are expressed relative to the FY 1991 activity level. It would also have been possible to increase the aircraft flying hours while leaving the various unit level optempos unchanged. The table shows that it is easy to change the optempo of one type of aircraft while leaving another unchanged. Users have total freedom in making changes to the optempos for any unit or equipment in any year.

The primary use of optempo factors is to calculate a total optempo, which is used with fuel, spare parts, and training munitions cost factors in estimating peacetime operations cost. In the case of the F-16C aircraft, the total optempo calculated in the first two years is zero because there are no F-16s in the forces until year three when the total optempo is 7,920 flying hours per year (36 * 220). These totals would be multiplied by the F-16C cost factors to estimate the total cost attributable to the F-16C equipment. The F-16C brigade will have additional costs not related to the number of aircraft. The following paragraphs expand this discussion and describe in more detail how cost factors are represented.

D. REPRESENTATION OF COST FACTORS

The model structure provides a place to enter cost factors for every unit and equipment type represented in the force. Data on fuel, spare parts, training munitions, and fixed operating and support costs are copied from a baseline cost factors table to match the unit and equipment types in the force structure for each alternative. Spare parts data are copied into a database that has cost factors for each year, allowing users to modify the source of spare parts funding throughout the planning period in the model. Fuel, training munitions, and fixed operating and support factors are represented with just one value that is assumed to be constant throughout the planning period. Users may modify the values of any cost factor.

Fuel costs are presented in Egyptian pounds. Spare parts, munitions, and fixed operating and support costs are in combinations of Egyptian pounds, hard currency, or FMS credits.

Cost factors for fuel, spare parts, and training munitions are related to each force structure entry's measure of optempo. For example, if an aircraft has an optempo measure

of flying hours per aircraft, the fuel cost factor is in terms of fuel costs per flying hour per aircraft. Not all units have an activity level that is easily described in terms of flying hours or training days (for example, air defense units or headquarters activities). For these types of units and equipment, the model is calibrated in terms of the level of operations in a reference year (e.g., FY 1991). In these cases, the value entered as the cost factor represents one percent of the annual costs in that reference year.

Increases or decreases in fuel, spare parts, or training munitions costs occur whenever the quantities of units or equipment change or when the optempo changes. Fixed operating support costs change only when the number of units or quantity of equipment changes—changes in optempo have no impact on these costs. Table III-6 shows a hypothetical example of cost factors, optempo, and the associated optempo measure for a subset of the fictional Air Force discussed in previous examples.

Table III-6 Representation of Cost Factors in the Model

Unit or Equipment		Optempo		Cost Factors					
				Fuel	Spares	Munitions		Fixed Support	
Type	Quantity	Level	Measure	LE	FMS	LE	FMS	LE	FMS
Air Force	1	100%	% FY91 level	100	0	0	0	20,000	50,000
Fighter BDEs	1	100%	% FY91 level	20					
F-4E BDEs	3	100%	% FY91 level	8		0	0	15,000	50,000
F-4E	144	180	fhrs/ac/yr	1,100	980	10	23		
F-16 BDEs	1	100%	% FY91 level	8		0	0	20,000	90,000
F-16A	32	180	fhrs/ac/yr	1,300	1,300	14	45		
F-16C	0	180	fhrs/ac/yr	1,350	1,330	15			

In the table, the factors for fuel, spare parts, and munitions are shown at the unit and equipment level. Fuel costs at the unit level might represent costs incurred by the Air Force workshops and other support activities and the factors for the brigades may represent fuel for generators and ground vehicles. Each year the model includes 10,000 LE for Air Force-wide activities not accounted for in lower levels and 2,000 pounds for activities supporting all fighter brigades, 800 LE for each F-4 and F-16 brigade. These fuel costs occur independently of the number of aircraft or their training levels. The total unit level fuel costs are 15,200 Egyptian pounds. However, because these units are only represented as a percentage of the FY 1991 operating level, the factors correspond to one percent of the total FY 1991 amount in order to ensure that the total value of quantity multiplied by optempo multiplied by the cost factor is correct.

15,200 LE = (1 Air Force) * (100 % FY91 operating level) * (100 LE)
+ (1 fighter BDEs) * (100 % FY91 operating level) * (20 LE)
+ (3 F-4E BDEs) * (100 % FY91 operating level) * (8 LE)
+ (1 F-16 BDEs) * (100 % FY91 operating level) * (8 LE)

The values that appear under the "Fuel/LE" column for the F-4Es and F-16s represent the fuel costs per flying hour for each aircraft type per year. This factor used with the number of aircraft and the optempo leads to a calculation of total fuel costs. The results for the F-4E aircraft are 28,512,000 Egyptian pounds.

28,512,000 LE = (144 aircraft) * (180 fhrs/ac/yr) * (1100 LE/yr/fhr)

Table III-6 also shows munitions and fixed operating and support cost factors. Munitions cost factors are entered at the equipment level. Their calculations would be carried out in the same manner as the fuel calculation for equipment. FOS cost factors are shown for Air Force-wide support, F-4E BDEs, and F-16 BDEs. The model would add 85,000 Egyptian pounds for this support. (Remember that FOS depends only on quantities.)

85,000 LE = (1 Air Force) * (20,000 LE)+ (3 F-4E BDEs) * (15,000 LE)
+ (1 F-16A BDE) * (20,000 LE)

The design of the model envisioned that fixed operating and support costs would be used primarily for units, but nothing in the model's calculations prevents using this factor for other costs that do not change with optempo.

The next section of the reference manual provides specific instructions on how to use the computer model.

IV. USING THE MODEL

The cost model permits users to build cost alternatives from effectiveness model databases, create new cost alternatives based on existing ones, modify data within the alternatives, calculate the impacts of changes on total costs, and produce reports. This section of the manual provides instructions on how to use each of the capabilities of the model.

When you first start the model, you will be able to use only three of the model's features:

- Select one of the existing alternatives,
- Build a new alternative from an effectiveness database, or
- Quit.

The other model features are shown for reference, but they are presented in a fainter color than the three initial options to indicate that they are not yet accessible. After you have selected or built an alternative the options are as follows:

- Select another of the existing alternatives,
- Build another alternative from an effectiveness database,
- Modify any of the following:
  - Unit Data - Peacetime operations,
  - War Reserve Materiel Data,
  - FMS Modernization Program Data, or
  - Project Data,
- Calculate a new peacetime cost estimate reflecting new data values,
- Print reports, or
- Quit.

The following subsections explain how to start the cost model, summarize the model's capabilities, and describe how to use each of the model's features.

A. HOW TO INITIALIZE THE MODEL

The Egyptian Defense Forces Cost Model is designed to work in dBASE III+. To start the model, change to the dBASE III+ directory using DOS, regardless of whether the dBASE directory is in the path statement. For example, if dBASE III+ is installed on the C drive in a subdirectory called dBASE you should start dBASE as follows:

- type **CD C:\DBASE** from the DOS prompt, then
- type **dBASE COST**

If dBASE is already open and running on the computer, the model can be started from within dBASE by entering **DO COST**. This initial procedure records how you have installed dBASE III+ on your personal computer, changes control to the model procedures in the COSTMDL subdirectory, and displays a title screen.

B. OVERVIEW OF COST MODEL CAPABILITIES

The title screen appears upon start-up and shows the four primary areas of cost you work with in the cost model. This screen also reminds you that the F10 function key starts the cost model. Once the model has been started as described in subsection A above, the model can be restarted from within dBASE at any time by pressing F10 if dBASE has not been closed since the model was last run.

After you press F10 the model displays the Main Menu for the cost model (Figure IV-1). The Main Menu has three parts, segregated by function. The first part contains two options pertaining to the selection of existing alternatives and the preparation of new ones. One of these two (i.e., [S] or [B]) must be chosen to proceed. Upon initial entry into the model, your only options are to choose one these two or to exit the cost model (i.e., [Q]). After an alternative has been identified, other options become available. The S option allows you to choose to work with an existing alternative, to create a new alternative from an existing one, or to delete an existing alternative. The **B** option allows you to build a new alternative by importing data in the format produced by the effectiveness model.

The choice indicated by **S**, Select, Create, or Delete Alternative, allows you to work with alternative force structures and the related data sets that already exist in the model. The choice indicated by **B**, Build Alt from Effectiveness Database, allows you to import new data that describes an alternative force structure from the force effectiveness model.

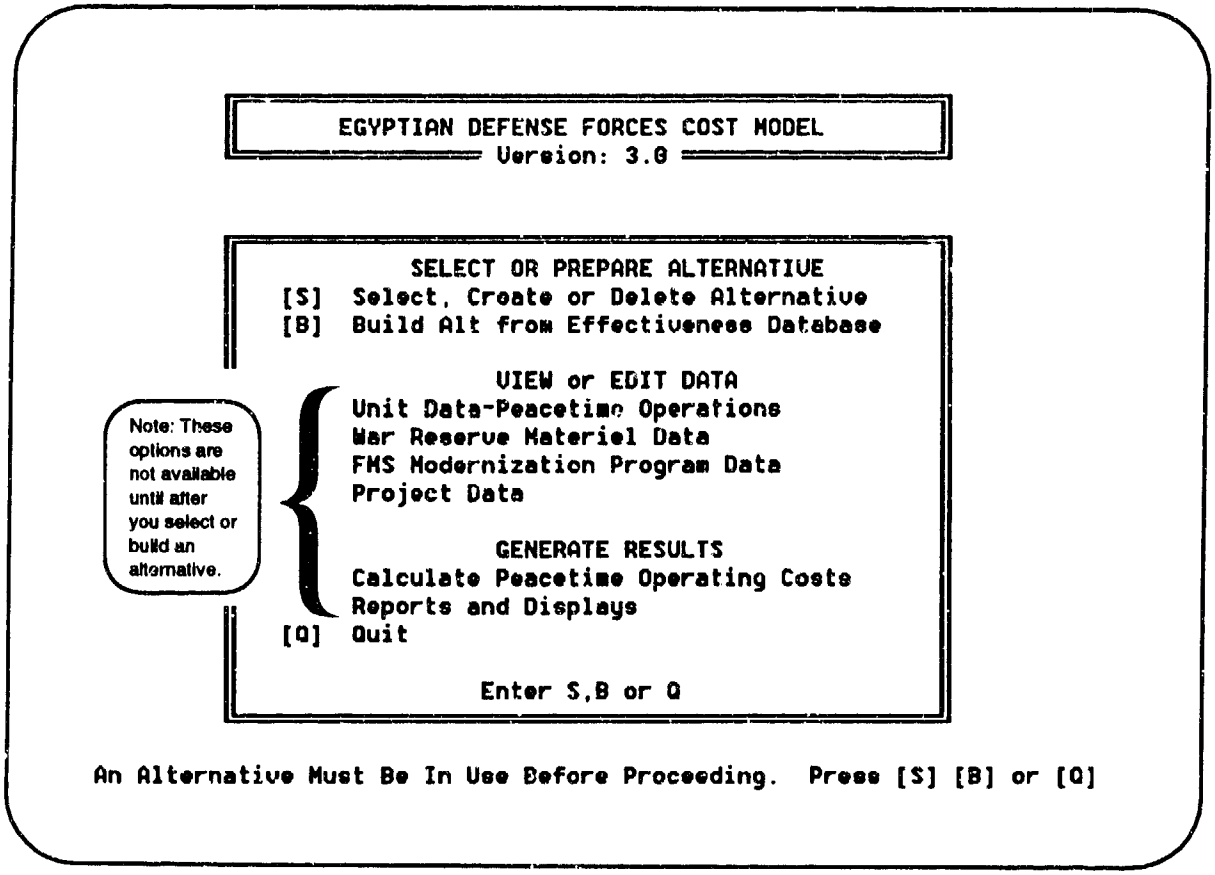


Figure IV-1. Main Menu Screen

If you want to work with an existing force alternative you enter **S** at the prompt to display the alternatives that are resident on your computer and to choose one to use. If you want to build a new cost alternative, you would enter **B**.

After you have chosen an alternative to use, the other portions of the menu that allow you to edit, review, recalculate, and prepare reports from the data are available. The option labeled **U**, `Unit Data - Peacetime Operations`, gives you access to an alternative to review and change all force and equipment quantities, manpower and optempo factors, and all peacetime cost characteristics. If you enter **W** for `War Reserve Materiel Data`, you get access to the information used to estimate the funding required to sustain wartime operations. When you select **F** for `FMS Modernization Program Data`, you have access to data on the major FMS system procurements that make up the modernization program for that alternative. This module allows you to select and revise delivery quantities, schedules, and cost characteristics. If you enter **P** for `Project Data`, you will be able to add, review, or revise data on any projects that accompany the selected alternative.

The bottom portion of the Main Menu provides choices for calculating and displaying results using the cost model. The options allow you to estimate peacetime operating costs and produce reports. When you select **C** for `Calculate Peacetime Operating Costs`, the cost model re-calculates all peacetime operating costs using all of the current information on force structure and equipment quantities, manning levels, and operating rates. By selecting **R** for `Reports and Displays`, you access the portion of the model that produces printed reports of information contained in the alternatives. The last option on the Main Menu, **Q** for `Quit`, allows you to exit the cost model.

C. SELECTING, CREATING, OR DELETING AN ALTERNATIVE

When you select **S** from the Main Menu, you change to a screen that helps you manage alternatives. The Alternative Selection screen displays a list of the existing alternatives, a menu with actions related to these alternatives, and the available storage space on your hard-disk (Figure IV-2).

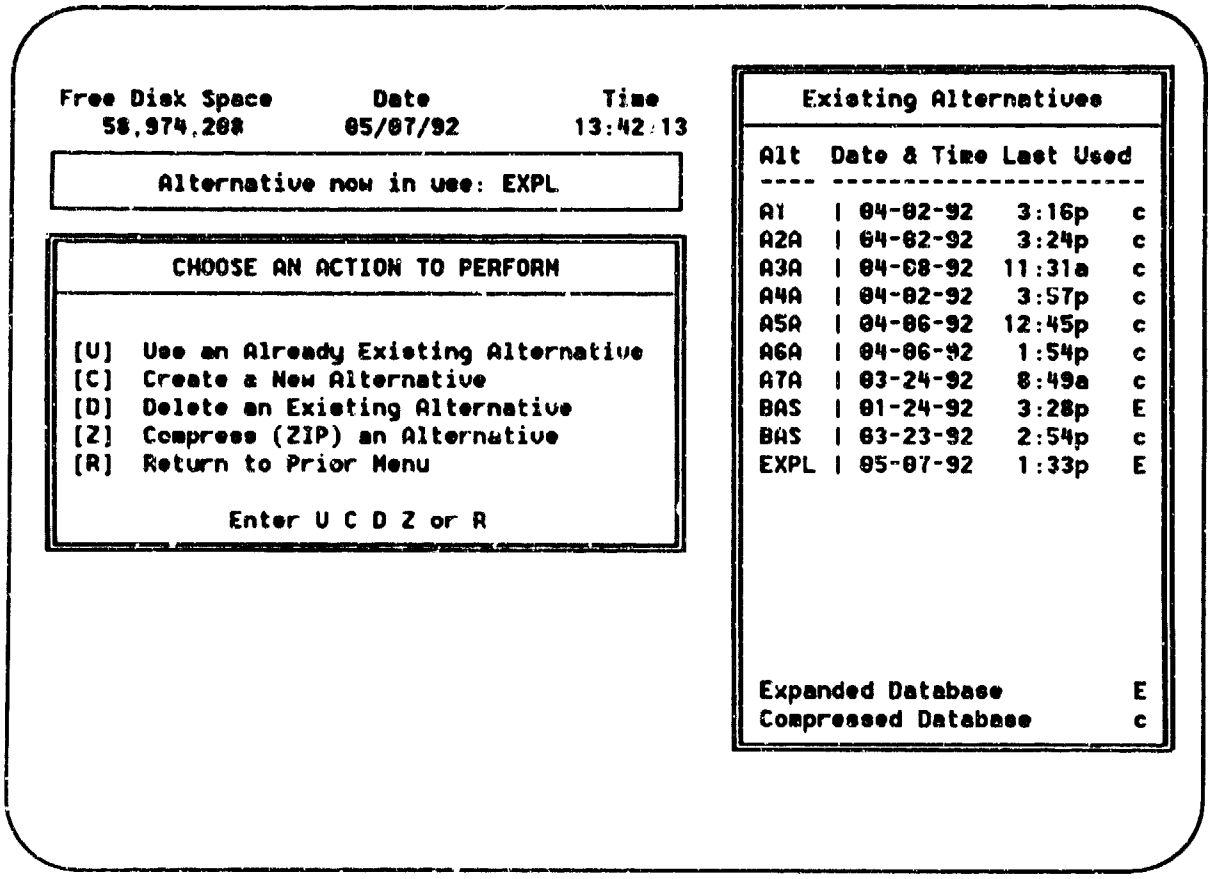


Figure IV-2. Alternative Selection Screen

The menu with the available choices is on the left of the Alternative Selection screen. The right of the screen lists all of the alternatives that are currently stored on your computer. The alternative currently in use is displayed directly above the menu.

1. Selecting an Alternative to Use

Entering **U** (`Use an Already Existing Alternative`) causes the model to prompt you for the name of one of the listed alternatives. Use this option whenever you want to work with a different alternative from the one currently open. If the alternative name you provide is not one of those listed on the right of the screen, you will be asked to re-enter a new alternative name. If the alternative name is listed in the box on the right of the screen, the model will open the files associated with that alternative, setting up the appropriate environment for their use. In the process of opening the new alternative, all files associated with a previously selected alternative will be saved and closed. (The old database will not, however, automatically be compressed. If little space is available on your hard disk, you may need to compress the active alternative then delete the uncompressed version before opening a new one. See Section IV.C.4. for more details.)

If the selected alternative is compressed, the cost model will automatically decompress the necessary files. After a new alternative is chosen, the `Alternative now in use:` message box will be updated to indicate the name of the new active alternative.

2. Creating a New Alternative from an Existing Alternative

At times you may want to create a new alternative that is a copy of an existing alternative so that you may make changes without loosing the original version. The menu selection **C** (`Create a New Alternative`) allows you to choose one of the existing alternatives as a basis from which to create a new alternative. By entering **C**, you cause the model to prompt you for the name of the alternative from which you wish to create the new alternative. The source file can be any existing alternative, but the model initially displays BASE as the source.[1] You may override the default choice of the baseline and choose any existing alternative as the source for the new alternative.

If the source does not exist, the model will inform you with a message. If the source exists but only as a compressed database, the model will ask you to decompress the alternative before proceeding with creating a new alternative. After the

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[1] "BASE" is the name used by the model to indicate the baseline file set. The baseline represents the Egyptian Defense Forces manning, optempo, and cost factors as of FY 1991.

model has the name of a usable alternative, it will ask you to provide a name for the new alternative. Any four-character name consisting of letters, numbers, or the underline character is permitted unless an alternative with that name already exists. If you have used an illegal character, it is highlighted and you are asked to enter the data again. If the new alternative name already exists, you may overwrite the existing alternative or provide another name. The name "BASE" can never be used when creating a new alternative.

If both the source and the new names are valid, the model creates the new alternative. As it creates the files associated with an alternative, the model displays its progress (Figure IV-3). After it finishes creating the new set of databases for the alternative, the model automatically uses the new alternative. If you do not wish to use the alternative that was just created at this time, you may select any other existing alternative.

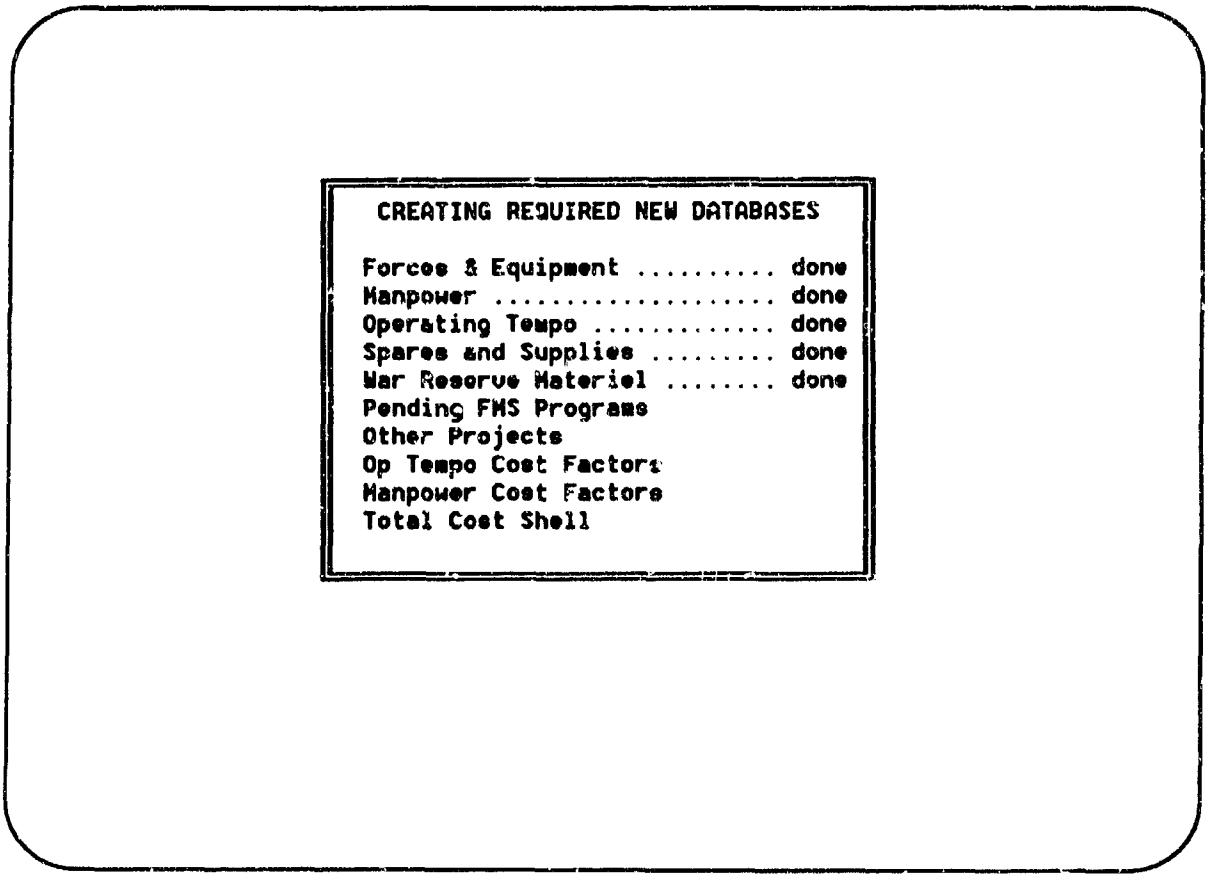

Figure IV-3. New Alternative Progress Screen

3. Deleting an Alternative

You may delete an alternative from your hard disk by selecting **D** from the Alternative Selection screen. If you choose **D** (`Delete an Existing Alternative`), the model asks you for the name of the alternative you want to erase. Only expanded (uncompressed) alternatives can be deleted through the model. The model does not allow you to remove compressed files.

After you type the name of the alternative to delete, the model will ask you to confirm that the name you typed is the name of the alternative you want to remove. If you typed the correct alternative name, answering **Y** for "Yes" and pressing RETURN will begin the process of deleting that alternative. If you have made an error when typing the name of the alternative or if you change your mind, enter **N** for "No" at this point and press RETURN. Nothing will be deleted until you press **Y** and then the RETURN.

4. Reducing the Disk Storage Requirements

All of the information associated with an alternative can consume as much as 1 megabyte of hard-disk space. If several alternatives reside on a single hard-disk, you may find yourself running out of hard disk storage space. To allow you to maintain several alternatives on your hard disk without using too much of its capacity, the model provides the option of compressing the data associated with an alternative. To help you decide whether or not to compress an alternative, the Alternative Selection screen displays the amount of free disk space available on the hard drive where the model resides. The information is displayed on the upper left portion of the screen. Compressed data use approximately one-tenth as much hard-disk space as the uncompressed data. Remember, *you may delete an expanded alternative without affecting a compressed version with the same name.*

The list titled `Existing Alternatives` on the right of the screen distinguishes between compressed and uncompressed alternatives by displaying `E` at the end of an expanded alternative and `C` after a compressed alternative. For example, in Figure IV-2, alternative A1A is expanded and all others are compressed. The compressed alternatives are also displayed in a fainter color. It is important to note that both an expanded and a compressed version of any alternative can exist simultaneously. To save the most disk space, the expanded version should be deleted after compression.

If you make an error on the Alternative Selection screen and enter a letter for an activity you did not want, you may press RETURN while there are only blanks in the response area to return to the Alternative Selection screen.

If you do not expect to work with a particular alternative frequently, or if you have used most of your hard-disk space, you may enter **Z** (`Compress (ZIP) an Alternative`) to initiate the compression procedures. The cost model asks you for the name of the alternative to compress. After the compression has been completed, the `Existing Alternatives` list will show the compressed alternative directly below the expanded alternative. The expanded version could then be deleted to maximize available disk space.

5. Exiting the Alternative Selection Screen

When you are finished managing files through the Alternative Selection screen, select **R** (`Return to Prior Menu`) to return to the Main Menu. Once you have returned to the Main Menu, the alternative that was in use when you left the Alternative Selection screen will remain in use. This will be indicated by displaying the name of the alternative in use on the model's Main Menu at the top of the screen, immediately below the model version number. Once an alternative has been put into use, the message that previously appeared at the bottom of the Main Menu (indicating that an alternative must be in use to proceed) will no long be displayed, and all model functions will be activated.

D. BUILDING AN ALTERNATIVE FROM EFFECTIVENESS DATA

From the Main Menu, enter **B** (`Build Alt from Effectiveness Database`) to begin the process of building a new alternative from a database external to the cost model. This is the mechanism by which the data from the Force Effectiveness Model can be transferred to the cost model. The cost model accepts any database in the form used by the effectiveness model and converts the data into the format used by the cost model.

The model initially prompts you for the full path and name of the database from which the new alternative is to be created (Figure IV-4). The source file can be either on a floppy disk or on your hard drive. In giving the full path and file name, you should enter the drive designator letter and the path (i.e., the subdirectories) where the file is located on the disk, followed by the file name. If you are referring to a database that you have already copied to the COSTMDL subdirectory, you may enter just the file name. (If the file name has an extension other than .DBF, make sure to include the extension with the file name.)

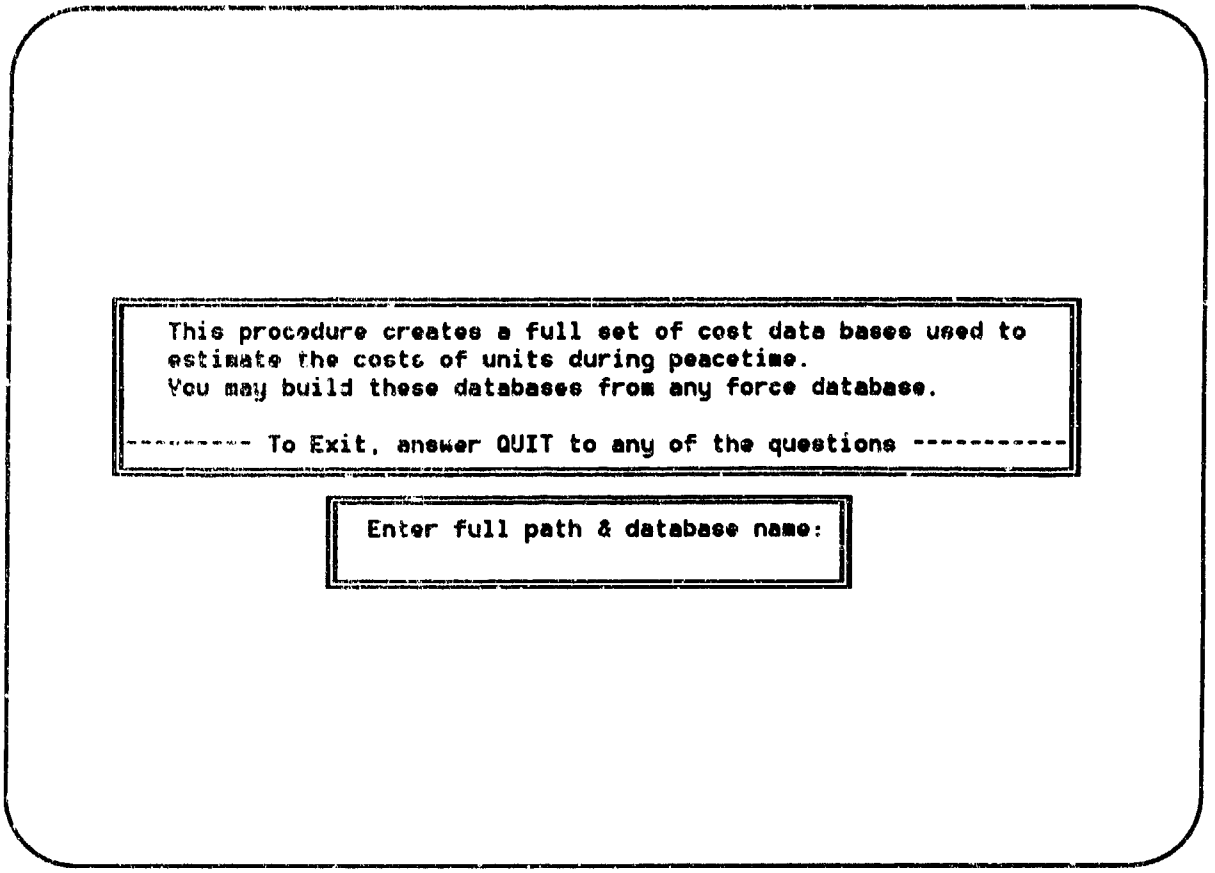

Figure IV-4. Query for Effectiveness Database Name and Location

After you have entered the location and name of the external data file, the model locates the specified file and confirms that the path and file name information are correct. If the effectiveness model is located in a different path than the cost model, you do not have to copy files into the cost model directories in order to create a new alternative. If you made an error and do not want to build a new alternative, enter **QUIT** and press RETURN to either this query or the one that immediately follows.

The next question that the model asks when you are building a new alternative is what name you want to give the new alternative. Just as when you create an alternative from an existing set of files, you can provide any combination of four alpha-numeric characters as a name. If the name you choose is already being used for an existing alternative, the model asks you if you want to overwrite the version that already exists. An answer of N for "No" will give you the opportunity to choose another name. You may also enter **QUIT** and press RETURN here if you wish to exit this module. Beyond this point it is not possible to exit without creating a new alternative. Building a new cost alternative requires between 15 and 40 minutes, depending on the speed of your computer.

After you enter the name you have chosen for the new alternative, a menu appears and gives you the option of producing a full or condensed version of the databases. If you choose the full option, each individually numbered division and brigade and each major type of equipment will have its own record in the databases. However, if you choose to build a condensed version of the databases,[2] each type of division (e.g., Eastern Equipped Armor, Western Equipped Mechanized) and brigade will appear only once. When the Condensed option is chosen, the quantities of both the units and the equipment are summarized to indicate the total quantity for each type of entry. The condensed version exists to speed the execution of the model (the size of these databases is less than half that of the full versions) and reduce storage space. The only time it is advantageous to use the Full option is when you plan to make changes to one unit that will not be the same as all other similar types of units. For example, if you want to know what happens to cost if you increase manning in one of the separate infantry brigades and not the others, you need databases with the full level of organizational detail.

After you decide how to represent the force structure, another menu appears. This menu asks whether the databases that are being created should reflect the current FY 1991 levels of manning and optempo or enhanced manning and optempo levels. Once you choose one of these two options, the model automatically begins the translation process. The translation process relies on two separate cost characteristics databases in the BASELINE subdirectory of the cost model. You may populate these tables with different manning and optempo factors.[3] Sections V.E. and VI.C.5. discuss these tables in greater detail.

When finished building the new alternative, the cost model automatically selects that alternative and opens the files associated with it. The model then reverts to the Main Menu with the newly created alternative listed as the alternative in use. If you entered **QUIT** at either of the first two queries and the model exited the build module, the model returned to the Main Menu. However, when this occurs there is no alternative listed in use. You must then go through the process of selecting one and using it.

---

2 Note that a condensed alternative is not the same as a compressed alternative. "Condensed" refers to how much detail is present in an alternative's representation of the force structure. "Compressed" refers to how data files are stored on the computer's hard disk.

3 If you choose the current rates entry (i.e., **0**) CHR_BAS0.dbf is used, and if you choose the enhanced rates (i.e., **1**) CHR_BAS1.dbf is used.

E. UNIT DATA FOR PEACETIME OPERATIONS

After an alternative has been selected, you may review and revise any data related to the force description or the cost factors. From the cost model's Main Menu, choosing **U** (`Unit Data-Quantities & Characteristics`) gives you the ability to view and edit quantities of units and equipment, manning factors, operating rate factors, and all cost factors associated with peacetime operations. When you type **U** to access the Unit Data portion of the model, the screen that appears (the Unit Data Menu) outlines the eight display choices available (Figure IV-5). If you choose **A**, you will see and be able to edit all of the quantity, manning, optempo, and cost factor data that exist for a single unit or type of equipment. If you select one of the other choices, you will see and be able to edit that type of information for approximately 20 different entries in the force structure at the same time. Select the way of viewing information that best fits your current use of the model. You may also choose to return to the Main Menu by selecting **R** at this point.

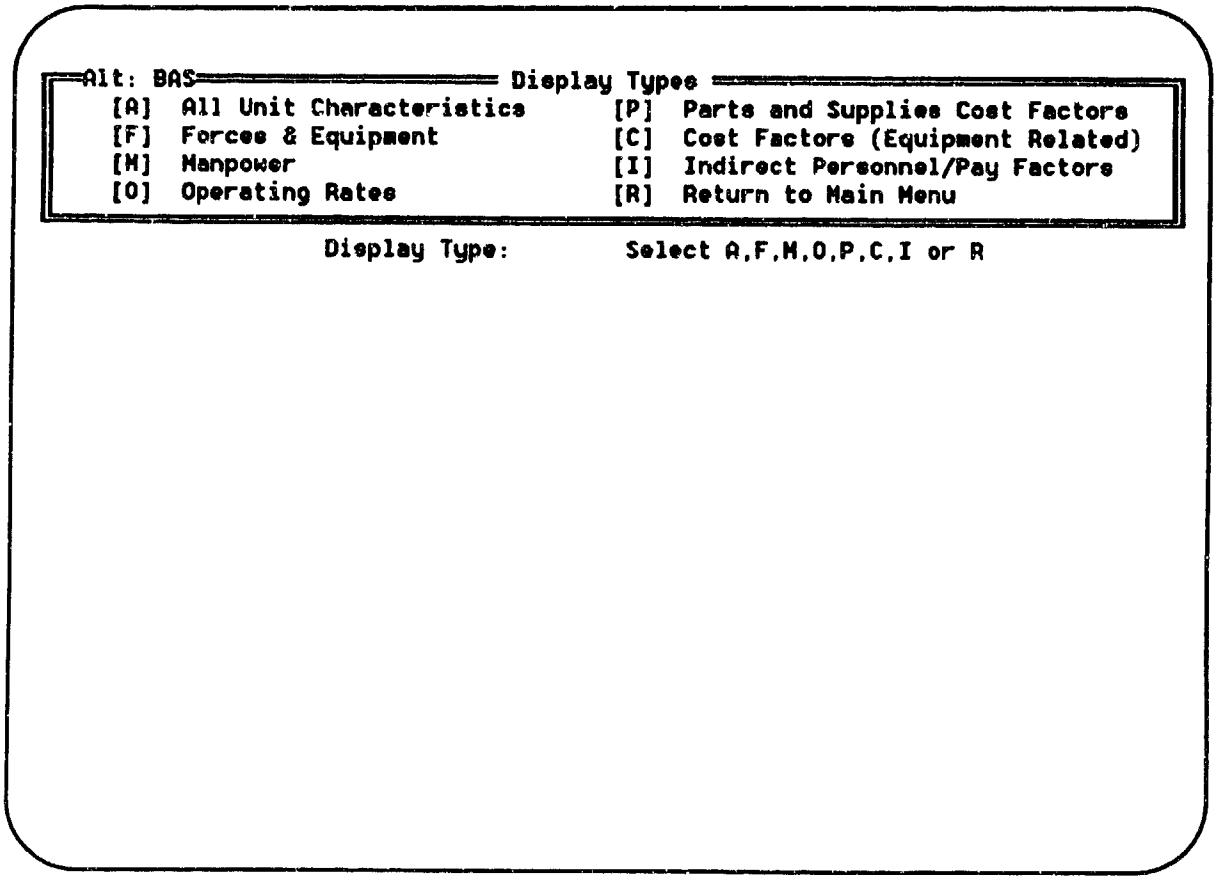

Figure IV-5. Unit Data Menu—Selecting a Data Type

Once you choose the type of display, two more lines appear (Figure IV-6). These two lines allow you to specify the area to examine (i.e., the Army, Air Force, Air Defense Force, Navy, or the last entry examined on previous screens). This speeds your access to the specific information with which you want to work. If you have come to this screen directly from the Main Menu rather than coming back to it from other screens, entering **L** (`Last Unit`) will move you to the first record in the database, Army General Cost.

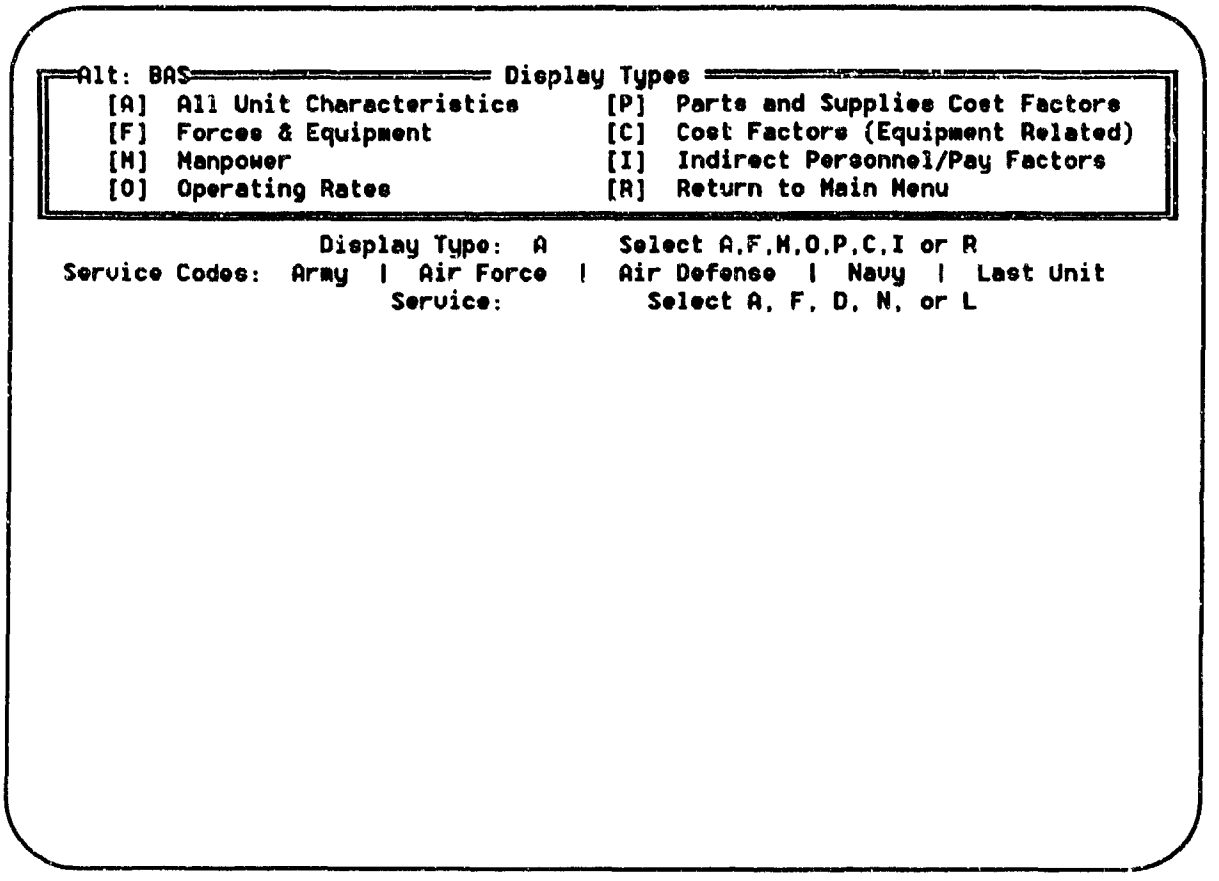

Figure IV-6. Unit Data Menu—Selecting a Service

If you choose a service rather than Last Unit, the bottom portion of the screen displays all Major Force Types within that service (Figure IV-7).

The list of Major Force Types provides an easy way of moving to the specific units within the service you have selected. By entering the three-character code for a Major Force Type, you cause the model to automatically position the display screen at the first record of that major force type. You do not always have to enter a Major Force Type. Alternatively, the model remembers the last entry examined, and by entering **L** here, you

move the model directly to the corresponding last entry. The lower right corner of the screen says "L for:" followed by the title of the entry last examined.

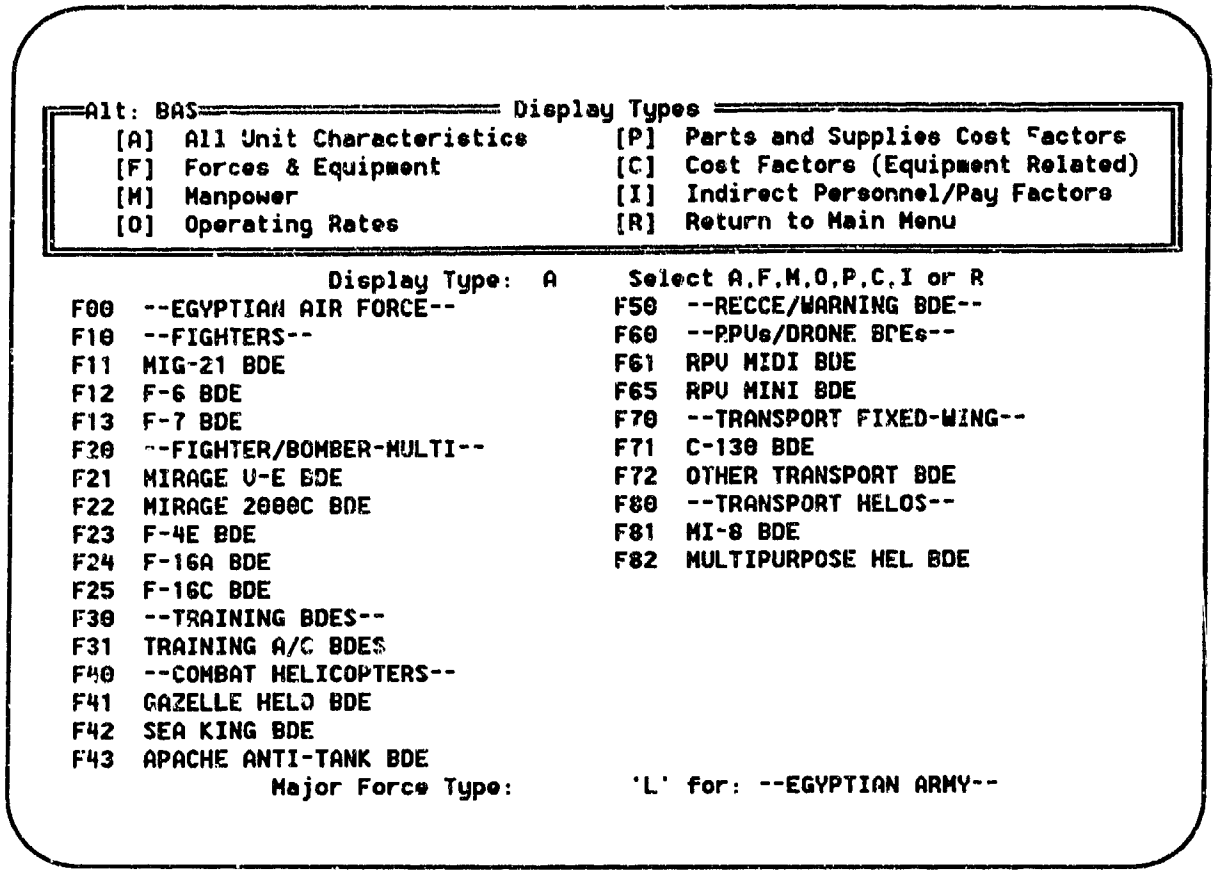

Figure IV-7. Unit Data Menu—Selecting a Major Force Type

The Major Force Type selection moves you into the general vicinity of the record you wish to examine. Unless you want to examine the first record of a specific category, you will need to move around in the database to find the record you are searching for. You may move one line at a time with the UP ARROW and DOWN ARROW keys or in blocks of about 20 records with the PAGE UP and PAGE DOWN keys.

The model does not automatically recalculate the total costs for peacetime operations of the Egyptian Defense Forces. This portion of the model only provides access to modify force quantities, cost drivers, and cost factors. It can display the total costs associated with one entry, but it does not estimate the costs for the entire force structure. Any time you

make a change to unit quantities, manning factors, optempos, or cost factors you should recalculate unit costs before printing any reports.[4]

The following subsections explain in more detail the options you may select from the Unit Data Menu.

1. All Unit Characteristics

If you enter A (`All Unit Characteristics`) from the Unit Data Menu, all of the characteristics related to a unit or item of equipment are displayed except for pay rates and the indirect personnel factors (Figure IV-8).

```
                              --EGYPTIAN ARMY--
                  FY91     FY92     FY93     FY94     FY95     FY96     FY97     FY98
No. of Units         1        1        1        1        1        1        1        1
                              Optempo for each Unit
% FY91 LEVEL     100.0    100.0    100.0    100.0    100.0    100.0    100.0    100.0
                              Manning for each Unit
          FY91     FY92     FY93     FY94     FY95     FY96     FY97     FY98
  OFF  31232.0  31232.0  31232.0  31232.0  31232.0  31232.0  31232.0  31232.0
  NCO  98280.0  98280.0  98280.0  98280.0  98280.0  98280.0  98280.0  98280.0
  CON 107740.0 107740.0 107740.0 107740.0 107740.0 107740.0 107740.0 107740.0

                    Cost Factors for each % FY91 LEVEL for each Unit
Spares  FY91     FY92     FY93     FY94     FY95     FY96     FY97     FY98
  LE  195370.0 195370.0 195370.0 195370.0 195370.0 195370.0 195370.0 195370.0
  HC  227960.0 227960.0 227960.0 227960.0 227960.0 227960.0 227960.0 227960.0
  FMS  40000.0  40000.0  40000.0  40000.0  40000.0  40000.0  40000.0  40000.0
                           LE        HC       FMS
        Fuel:           441450.0
        Training Muns:   10000.0       0.0       0.0

[FE]  Forces/Equipment Qtys       [FL]  Fuel              [NE]  Next Entry
[OT]  Optempo                     [TN]  Training Muns     [PE]  Previous Entry
[Mx]  Manning (x = O,N, or C)     [UC]  View cost data    [RP]  Return to Prior
[Sx]  Spares  (x = L,H, or F)                                   Menu
Alt: EXPL          Select data to edit or other action
```

Figure IV-8. Edit Screen for All Unit Characteristics

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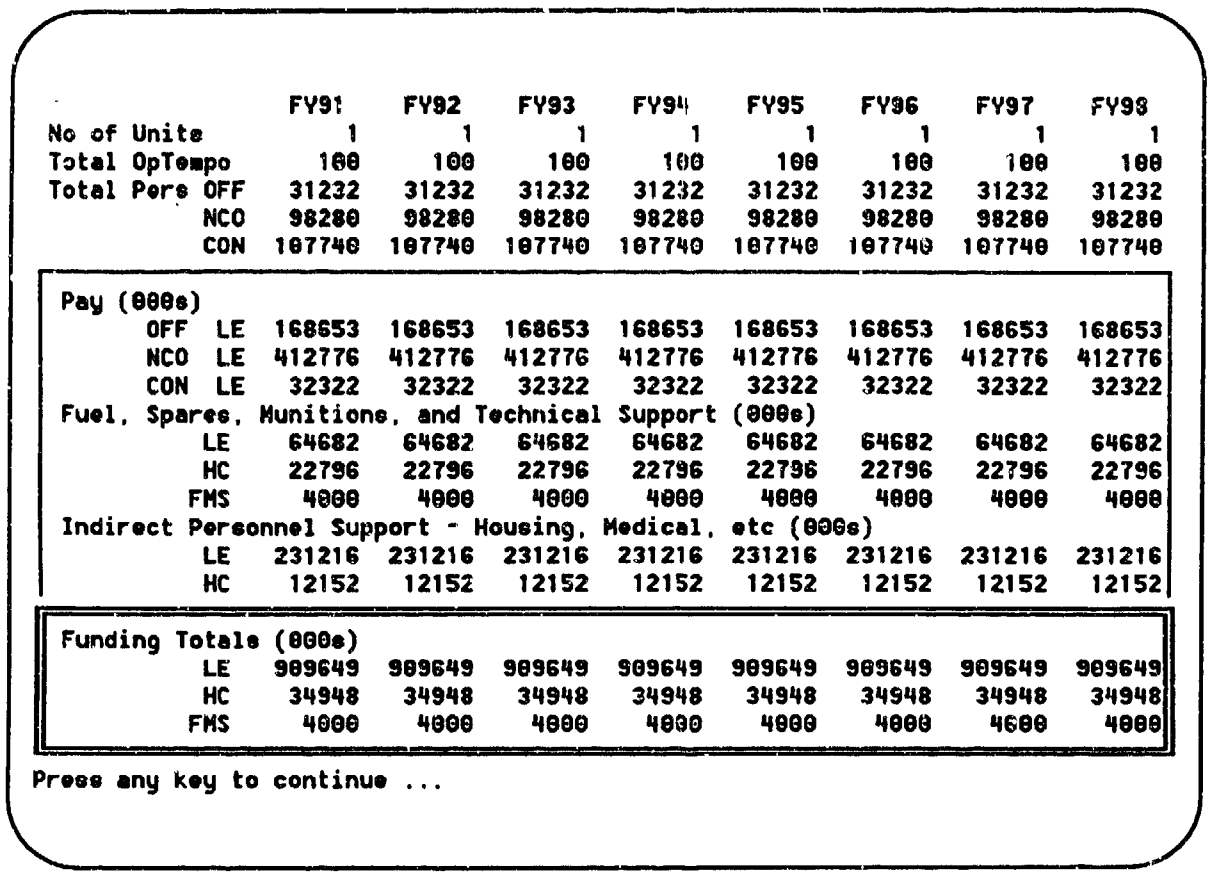
4 To calculate, return to the Main Menu and select C (`Calculate Peacetime Operating Costs`). This starts the recalculation process. More information on this portion of the model is provided in Section IV.I.

The top line indicates the type of unit or equipment information being displayed. If the record is a unit, only the type of unit will be displayed; however, if the record is an item of equipment, the name of the item of equipment as well as the unit that item of equipment is assigned to will be displayed. Below this, the screen shows the quantities of the item displayed regardless of whether it is a unit or item of equipment. Further down the screen, the model displays the operating rate information. The label at the left edge of the line indicates the unit of measure of the optempo. The heading in the border directly above the operating tempo information indicates whether the record is for a unit or an item of equipment. Beneath the optempo information are the manning factors associated with the unit or item of equipment. This section separately shows officer, non-commissioned officer (NCO), and conscript manning factors. The labels for each appear, respectively, as OFF, NCO, and CON. The last section of the screen displays the cost factors for specific commodities. Spares are listed by year and by funding type. Fuel and munitions factors do not change over time and therefore are only listed by funding type. The unit of measure for all of the factors is displayed in the heading in the border.

The menu for this display is shown on the last five lines of the screen. The alternative in use is shown in the lower left corner. The options on the menu are listed in three columns. The left column of options accesses the values displayed on the screen in order to change unit/equipment quantities, optempo, manning levels, and spares cost factors. The first two options in the second column give access to the fuel and training munitions cost factors. The third column lists all the database position control options: NE - Next Entry, P - Previous Entry, or RP - Return to the Prior Menu.

The last option in the middle column **VC**, `View Cost` is unique and significant. If you enter **VC**, the model will calculate the costs associated with the unit or item of equipment selected. The results of this calculation are displayed on a separate screen that appears when the calculation is complete. (See Figure IV-9.) Not only are the costs attributable to the factors displayed on the initial screen calculated, but pay costs and indirect personnel costs are calculated as well. The bottom portion of the table in Figure IV-9 sums the total costs associated with the current record. The combination of the unified screen and this cost table provide a convenient way of making changes and seeing their impact almost immediately. It is important to note that the costs are computed only for the current record, not the entire force.



		FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98
No of Units		1	1	1	1	1	1	1	1
Total OpTempo		100	100	100	100	100	100	100	100
Total Pers	OFF	31232	31232	31232	31232	31232	31232	31232	31232
	NCO	98280	98280	98280	98280	98280	98280	98280	98280
	CON	107740	107740	107740	107740	107740	107740	107740	107740
Pay (000s)									
OFF	LE	168653	168653	168653	168653	168653	168653	168653	168653
NCO	LE	412776	412776	412776	412776	412776	412776	412776	412776
CON	LE	32322	32322	32322	32322	32322	32322	32322	32322
Fuel, Spares, Munitions, and Technical Support (000s)									
	LE	64682	64682	64682	64682	64682	64682	64682	64682
	HC	22796	22796	22796	22796	22796	22796	22796	22796
	FMS	4000	4000	4000	4000	4000	4000	4000	4000
Indirect Personnel Support - Housing, Medical, etc (000s)									
	LE	231216	231216	231216	231216	231216	231216	231216	231216
	HC	12152	12152	12152	12152	12152	12152	12152	12152
Funding Totals (000s)									
	LE	909649	909649	909649	909649	909649	909649	909649	909649
	HC	34948	34948	34948	34948	34948	34948	34948	34948
	FMS	4000	4000	4000	4000	4000	4000	4000	4000

Press any key to continue ...

Figure IV-9. Display from "View Cost" Data Option

2. Forces and Equipment

The second option available in the Unit Data Menu (Figure IV-5) is [F] (Forces & Equipment). If you enter **F** as the display type, you open the edit screen for quantities of units and equipment data. After you choose **F**, you select the part of the database to view in the same manner as described previously. After you have picked the area to view, a screen appears that provides introductory information. It tells you that you may press F2 to save any changes you have made and then exit from the edit screen. It lists the type of database you are viewing, the name of the alternative currently in use, the name or identifier of the unit that is being sought, and the unit of measure for all records in the database (Figure IV-10).

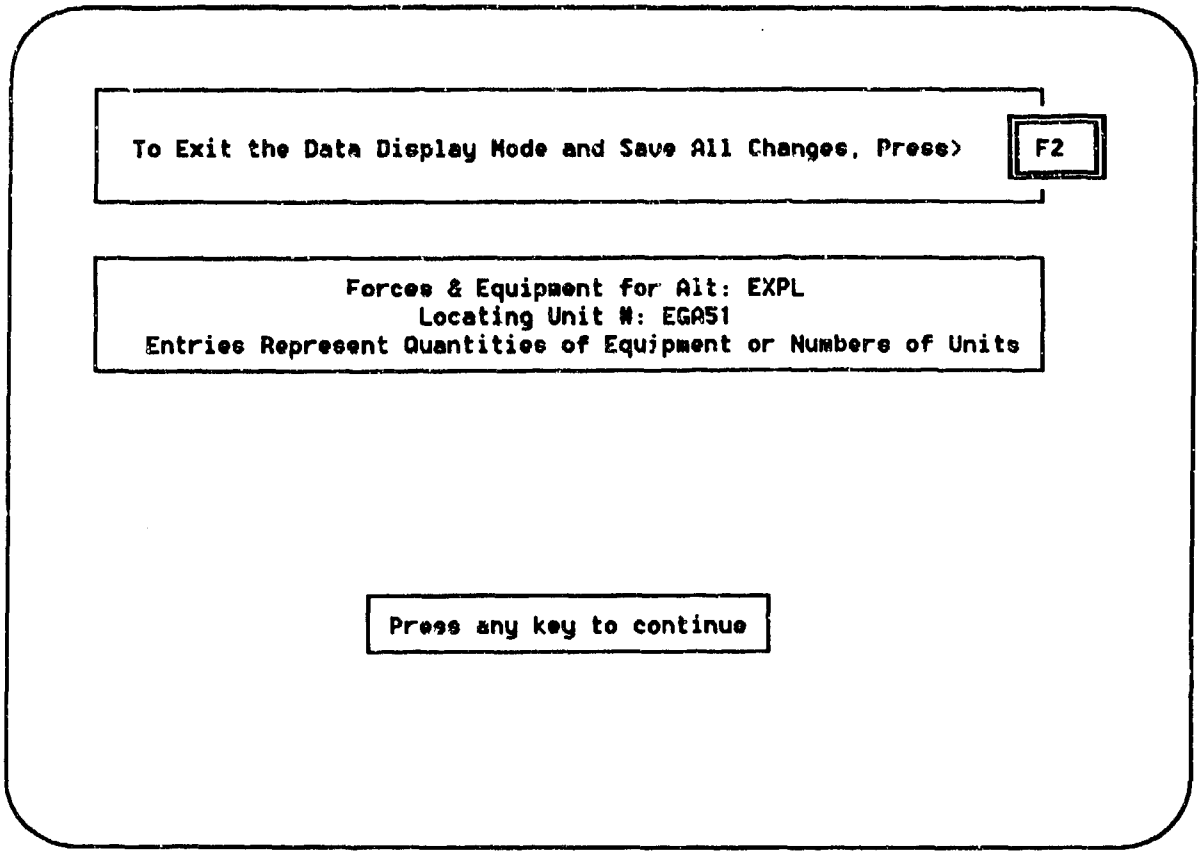


Figure IV-10. Introductory Screen for Peacetime Unit Data Displays

If you press any key at this point, you move to the data display screen. This screen is the normal dBASE III+ browse screen. You may navigate through this screen using the directional arrow keys and the PAGE UP and PAGE DOWN keys on your keyboard. This display provides the record title and the quantities in the force by year. To exit at any point and return to the Unit Data Menu, press F2. The actual forces data screen is shown in Figure IV-11. (The data shown are not actual values.)

3. Manpower

You may edit or examine the manning levels by entering M (Manpower) from the Unit Data Menu (Figure IV-5). The first screen that appears is similar to the one that appears for forces and equipment quantities. The top portion identifies how to save changes, the middle portion identifies the type of database, the alternative in use, the unit or identifying code being sought, and the unit of measure for the records. The bottom portion of the screen contains a separate menu that allows you to choose which specific types of manpower levels to examine. You may choose to examine either officers, NCOs,

or conscripts singly, or any combination of the three. You also have the opportunity to return to the Unit Data Menu at this point. Regardless of which manpower type you choose, a standard browse screen appears that displays the record title and the levels of manning by year. Each type of manpower is identified by the column headings. Columns representing officers are labeled OFFyy where yy indicates the last two digits of a year. NCO levels will be indicated similarly as NCOyy, and conscripts likewise are labeled CONyy. When you choose to view officer and NCO manning factors together, the data for each category for the same year appear side by side (e.g., OFF91 NCO91 OFF92 NCO92 ...) Figure IV-12 shows a sample screen where officer, NCO, and conscript data are displayed side by side.

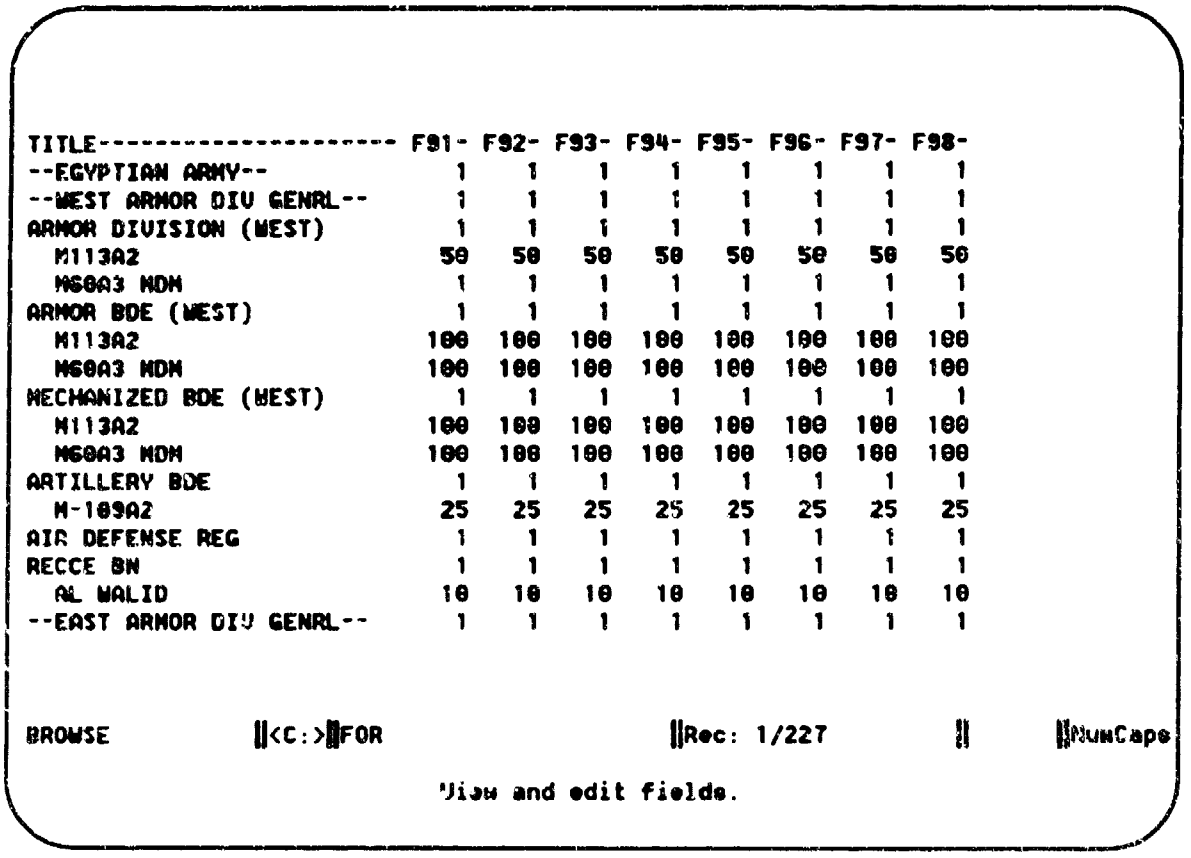


Figure IV-11. Edit Screen for Forces and Equipment

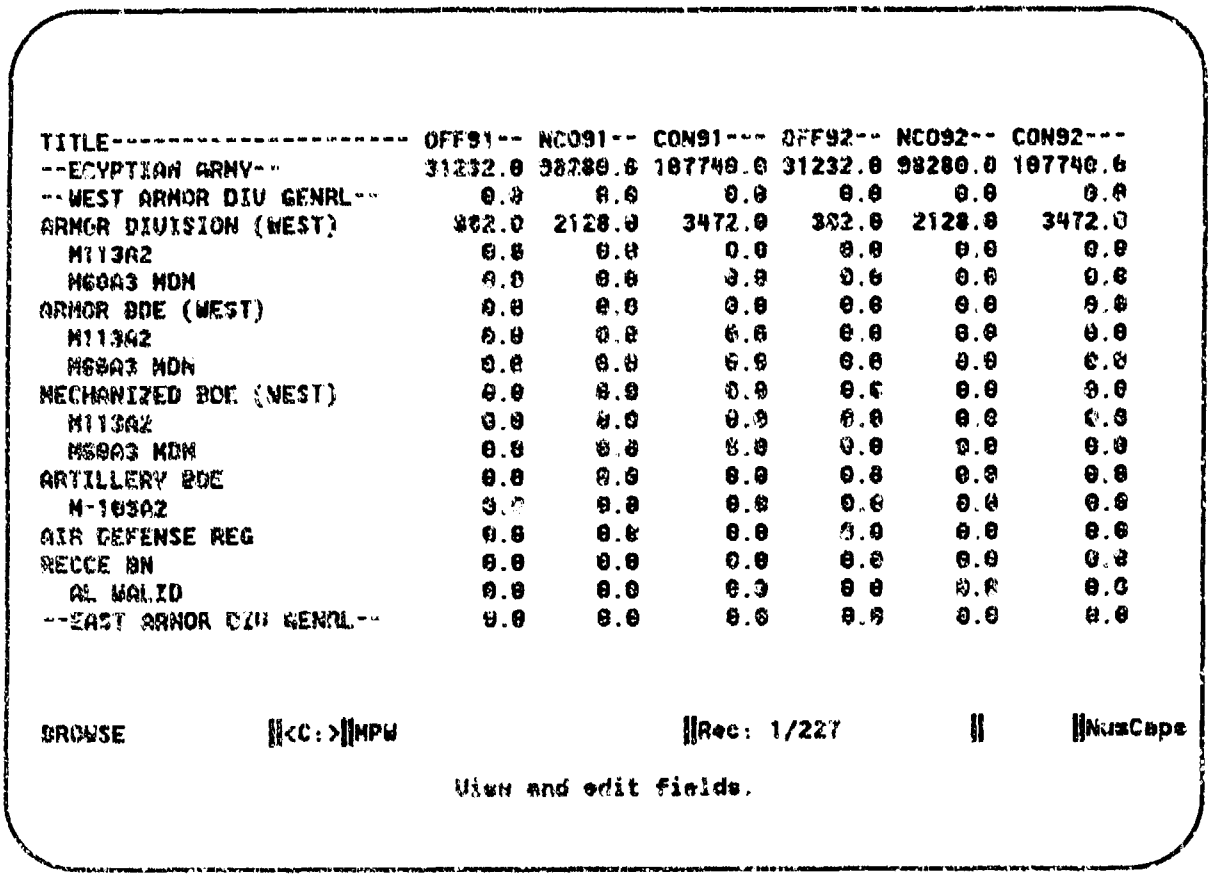


Figure IV-12. Edit Screen for Manpower Factors

You exit this screen by pressing F2. Whenever you leave the manpower edit screen, you automatically return to the manpower introductory screen with the menu of alternative manpower displays. At this point you may choose another view or leave the manpower portion of the model. Select **R** (`Return to Prior Menu`) to return to the Unit Data Main Menu.

4. Operating Rates

If you enter **O** (`Operating Rates`) from the Unit Data Menu (Figure IV-5), the model displays an introductory screen that is similar to the forces and equipment screen. It informs you how to save changes, the type of database being used, the alternative in use, the unit or identifying code being sought, and the unit of measure for all records. You enter the browse mode by pressing any key after the introductory screen appears. If all of the years do not fit on the screen at once, use the CONTROL and the RIGHT ARROW keys to scroll the columns to the right. By using the CONTROL and the LEFT ARROW keys, you scroll the screen back to the left.

There are two important points to note here. First, whenever it is necessary to scroll columns in order to view more information, the columns that identify each record do not move. Second, there are two columns that serve to identify each record in the optempo displays. The first column is the title field that appears in each of the databases and contains the unit type or equipment name. The second column is labeled as OPS_MEAS and holds the measure of operating tempo for each record. This information is important because it tells you whether the factors are per field training hour, flying hour, or a percent of a normal activity level in FY 1991. Higher level units like divisions are usually counted in percentages of their 1991 peacetime operating rate, whereas aircraft are usually counted in flying hours per aircraft per year. Figure IV-13 shows a sample of an optempo factors edit screen.

TITLE----------	OPS_MEAS----	F91---	F92---	F93---	F94---	F95---
--EGYPTIAN ARMY--	% FY91 LEVEL	100.0	100.0	100.0	100.0	100.0
--WEST ARMOR DIV GENRL--	% FY91 LEVEL	100.0	100.0	100.0	100.0	100.0
ARMOR DIVISION (WEST)	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
M113A2	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
M60A3 MDM	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
ARMOR BDE (WEST)	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
M113A2	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
M60A3 MDM	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
MECHANIZED BDE (WEST)	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
M113A2	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
M60A3 MDM	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
ARTILLERY BDE	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
M-109A2	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
AIR DEFENSE REG	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
RECCE BN	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
AL WALID	FLD TNG HRS	252.0	252.0	252.0	252.0	252.0
--EAST ARMOR DIV GENRL--	% FY91 LEVEL	100.0	100.0	100.0	100.0	100.0

BROWSE ||<C:>||OPS ||Rec: 1/227 || ||NumCaps

View and edit fields.

Figure IV-13. Edit Screen for Operating Rates

5. Parts and Supplies Cost Factors

You may view and edit spare parts cost factors from the Unit Data Menu by selecting **P** as the display type. Selection of the starting point for viewing the data is handled the same as for other factors. Once again, the major portions of the initial screen are similar to the ones that appear for other areas of the Unit Data displays. The bottom portion of this screen has a separate menu. It allows you to choose to examine the spare parts cost factors for any combination of the three types of spares funding. You also have the option to return to the prior menu from this point

By entering more than one of the identifying codes (i.e., **E** for Egyptian pounds, **H** for hard currency, and **F** for FMS), you are able to view more than one type of factor at once if you want to. If you enter **EF**, when the next screen appears, it will present both the Egyptian pounds and FMS spares factors side by side over the year span 1991 to 1998. The column headings identify the year and funding type. Egyptian pounds factors are in columns titled LE91 through LE98. Hard currency spare parts factors are titled HC91 through HC98. FMS factors are similarly headed by labels ranging from FMS91 to FMS98. Thus, if you enter **E**, factors would be displayed only in Egyptian pounds. If you enter **HEF** instead, the next screen will display spares factors in Egyptian pounds, hard currency, and FMS for 1991 and the subsequent years.

The order in which the codes are entered does not affect the order in which the factors are displayed. Egyptian pounds are always displayed first, hard currency next, and FMS funds last.

You may enter **R** in any position and the model will exit from the spares module and return directly to the Unit Data Menu. **R** will take precedence over any other entries that are made at the same time. Thus, an entry of **FHR** will return you to the prior menu, the same effect as entering **R** by itself.

Each line of factors is associated with the system or unit listed on the left side of each line. The units of measure for each system or unit are also listed in the column labeled OPS_MEAS. Whenever you scroll the display to the right in order to expose more years of factors, the two identifying columns, TITLE and OPS_MEAS will continue to be displayed and will not scroll off the screen.

6. Cost Factors (Equipment Related)

You may edit fuel and training munitions cost factors from the Unit Data Menu when you select enter **C**. The opening screen is very similar to the other introductory screens. The bottom portion of this entry screen displays a menu that allows you to choose fuel or training munitions (Figure IV-14). You may also return to the Unit Data Menu screen from this point by entering **R**.

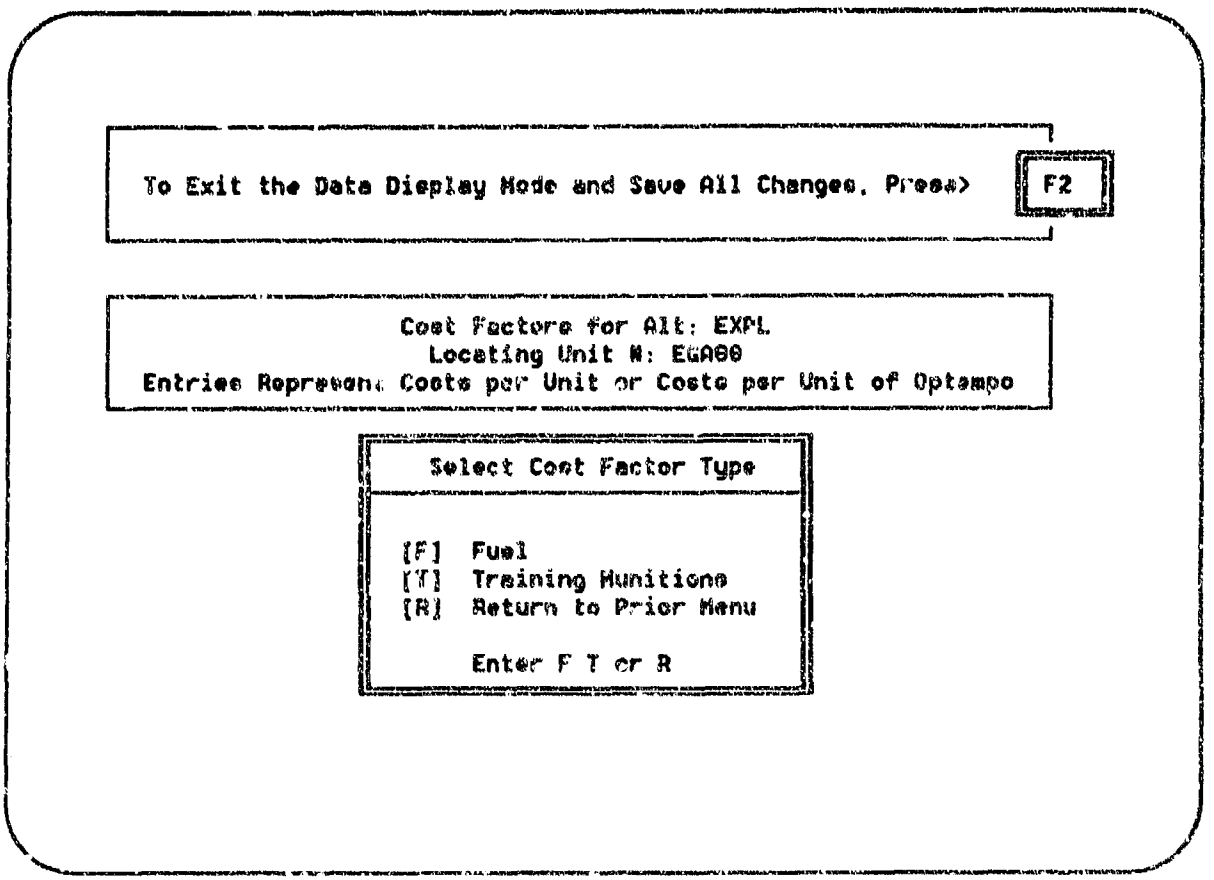


Figure IV-14. Selecting Fuel or Training Munitions to Edit

If you enter F for fuel, you will be able to view and revise the fuel factors for the units and equipment included in the current alternative. The display will show a column with the type of unit or equipment, the unit of scaling for the fuel factors in a column labeled OPS_MEAS, and the fuel factor. Fuel factors per unit of operating tempo do not change with time and therefore do not require separate entries for each year. Additionally, fuel is only funded in Egyptian pounds so the label over the fuel factor column is FUEL_LE, where the LE indicates Egyptian pounds. Figure IV-15 shows a picture of the fuel factor data edit screen.

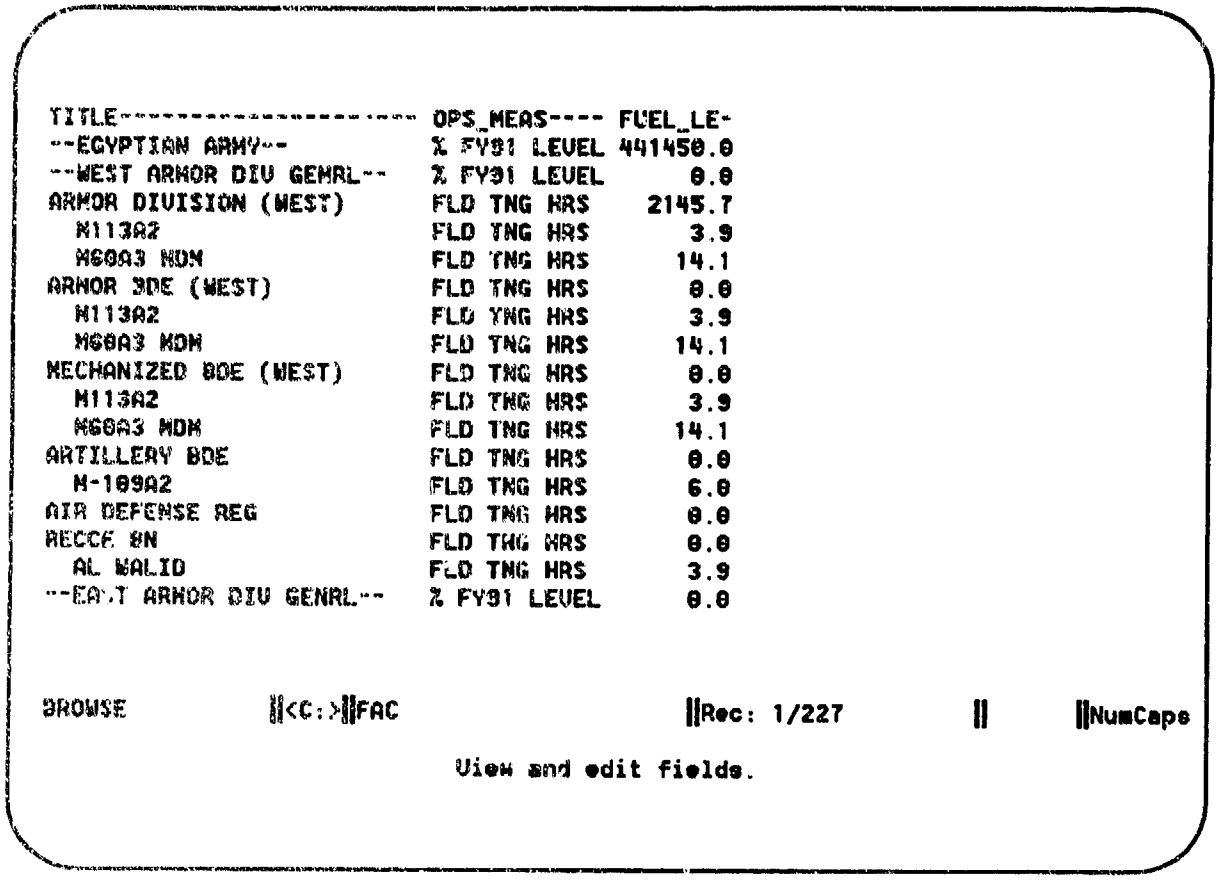


Figure IV-15. Edit Screen for Fuel Cost Factors

The training munitions cost factors may be examined by selecting T (Training Munitions). Two columns identify each unit and equipment entry. The TITLE column provides the name of the unit or item of equipment and the column headed by OPS_MEAS contains the basis on which the training munitions factors are scaled. The actual training munitions factors are displayed in three columns, one each for the three types of funding. TNGMUN_LE, TNGMUN_HC, and TNGMUN_FMS head the columns containing the Egyptian pound, hard currency, and FMS training munitions cost factors. Like fuel factors, training munitions factors per unit of optempo do not change from year to year and therefore only require one column for each type of factor. Figure IV-16 shows the training munitions data edit screen.

TITLE----------	OPS_MEAS----	TNGMUN_LE	TNGMUN_HC	TNGMUN_FMS
--EGYPTIAN ARMY--	% FY91 LEVEL	10000.0	0.0	0.0
--WEST ARMOR DIV GENRL--	% FY91 LEVEL	0.0	0.0	0.0
ARMOR DIVISION (WEST)	FLD TNG HRS	445.8	0.0	2948.8
M113A2	FLD TNG HRS	0.9	0.0	0.0
M60A3 MDM	FLD TNG HRS	5.8	0.0	35.1
ARMOR BDE (WEST)	FLD TNG HRS	0.0	0.0	0.0
M113A2	FLD TNG HRS	0.9	0.0	0.0
M60A3 MDM	FLD TNG HRS	5.8	0.0	35.1
MECHANIZED BDE (WEST)	FLD TNG HRS	0.0	0.0	0.0
M113A2	FLD TNG HRS	0.9	0.0	0.0
M60A3 MDM	FLD TNG HRS	5.8	0.0	35.1
ARTILLERY BDE	FLD TNG HRS	0.0	0.0	0.0
M-109A2	FLD TNG HRS	10.6	0.0	0.0
AIR DEFENSE REG	FLD TNG HRS	0.0	0.0	0.0
RECCE BN	FLD TNG HRS	0.0	0.0	0.0
AL WALID	FLD TNG HRS	0.9	0.0	0.0
--EAST ARMOR DIV GENRL--	% FY91 LEVEL	0.0	0.0	0.0

BROWSE ||<C:>||FAC ||Rec: 1/227 || ||NumCaps

View and edit fields.

Figure IV-16. Edit Screen for Training Munitions Cost Factors

7. Indirect Personnel/Pay Factors

If you enter I (`Indirect Personnel/Pay Factors`) from the Unit Data Menu, you access to the factors that are used to estimate the indirect support costs. Figure IV-17 shows a picture of this screen. Like other Unit Data introductory screens, this one tells you how to save changes upon exiting the display mode, the alternative being used, and the unit of measure for each entry on the subsequent data screen.

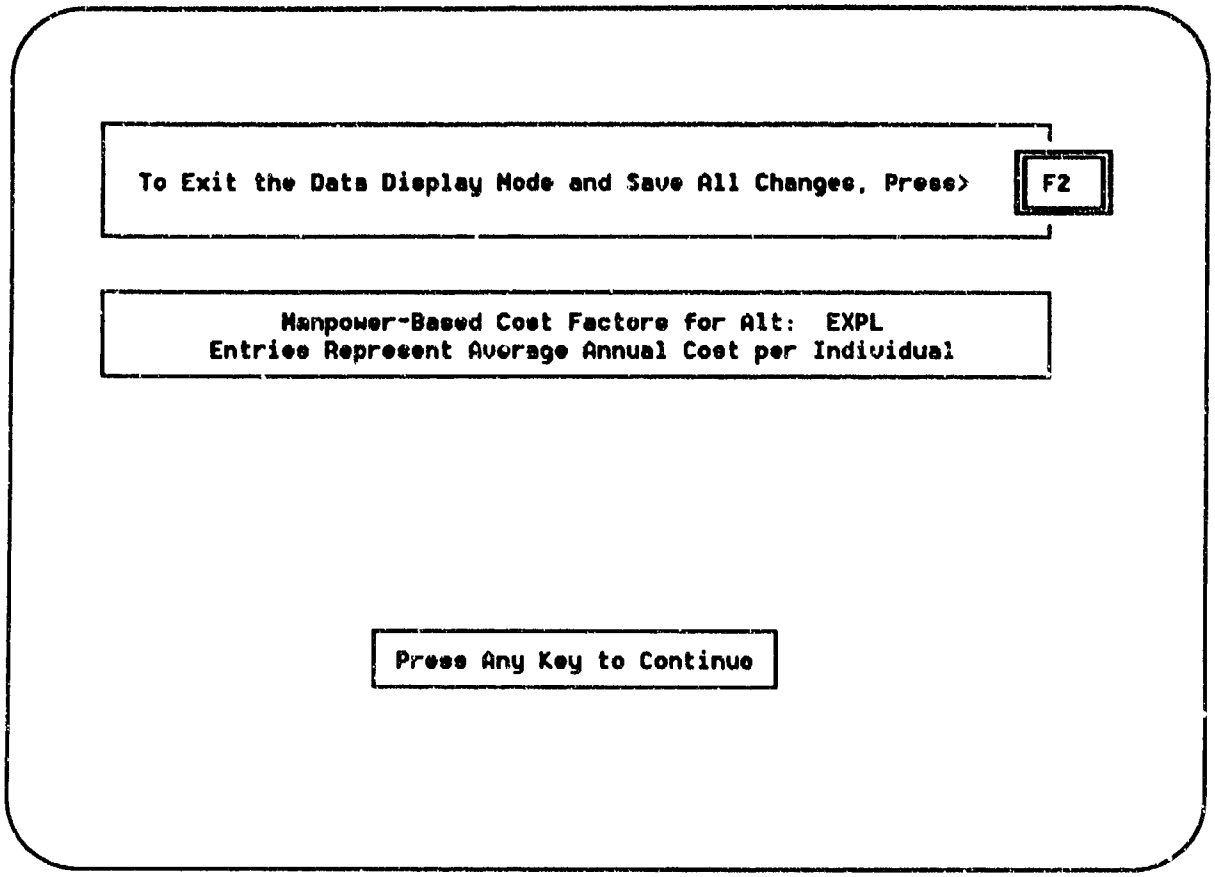
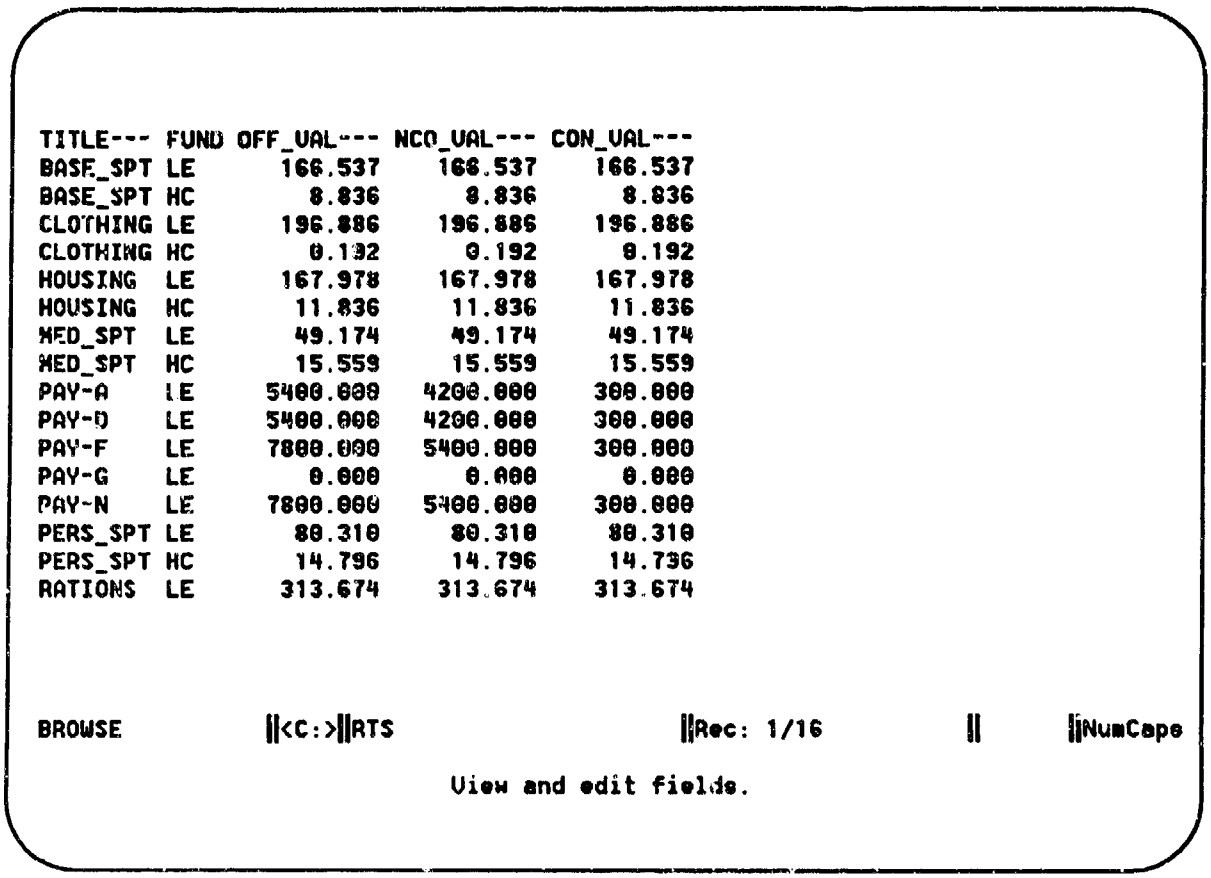


Figure IV-17. Introductory Screen for Indirect Personnel/Pay Factors

Because the personnel-based cost factors do not change from unit to unit or system to system, and only the pay rate changes from service to service, factors are listed once each by the category of support they fund. The display mode is the typical browse screen. The first column lists the title of the factor. In cases where there are two titles that are

identical, they are differentiated by the fact that they are funded with two different currencies. The type of funding for each factor is indicated in the second column by the standard abbreviations. The actual factors themselves differ by type of personnel. For this reason, there are three columns of factors. Each column respectively contains the factors for officers (OFF_VAL), NCOs (NCO_VAL), and conscripts (CON_VAL). In some cases, the factors are the same for each personnel type. In other cases, there are significant differences between the costs associated with the different personnel categories. Figure IV-18 shows a picture of the indirect personnel support cost factors edit screen.

You exit this screen by pressing the F2 key, which returns you to the Unit Data Menu.



TITLE---	FUND	OFF_VAL---	NCO_VAL---	CON_VAL---
BASE_SPT	LE	166.537	166.537	166.537
BASE_SPT	MC	8.836	8.836	8.836
CLOTHING	LE	196.886	196.886	196.886
CLOTHING	MC	0.192	0.192	0.192
HOUSING	LE	167.978	167.978	167.978
HOUSING	MC	11.836	11.836	11.836
MED_SPT	LE	49.174	49.174	49.174
MED_SPT	MC	15.559	15.559	15.559
PAY-A	LE	5400.000	4200.000	300.000
PAY-D	LE	5400.000	4200.000	300.000
PAY-F	LE	7800.000	5400.000	300.000
PAY-G	LE	0.000	0.000	0.000
PAY-N	LE	7800.000	5400.000	300.000
PERS_SPT	LE	80.310	80.310	80.310
PERS_SPT	MC	14.796	14.796	14.796
RATIONS	LE	313.674	313.674	313.674

Figure IV-18. Edit Screen for Indirect Personnel/Pay Factors

F. War Reserve Materiel Objectives

From the cost model's Main Menu, press **W** to transfer to the WRM Menu. This menu gives you five options you may use to tailor the WRM portion of the cost model (Figure IV-19). Through this menu, you are able to:

- edit the WRM objectives by unit and equipment type (**C**),
- delete a unit or equipment type from the list of WRM programs (**D**),
- price the WRM program using the current objectives and force composition (**P**),
- insert the current quantities of units and equipment to reflect any force changes you have made through the Unit Data portion of the module (**T**), and
- view the current WRM total cost without recalculating (**V**).

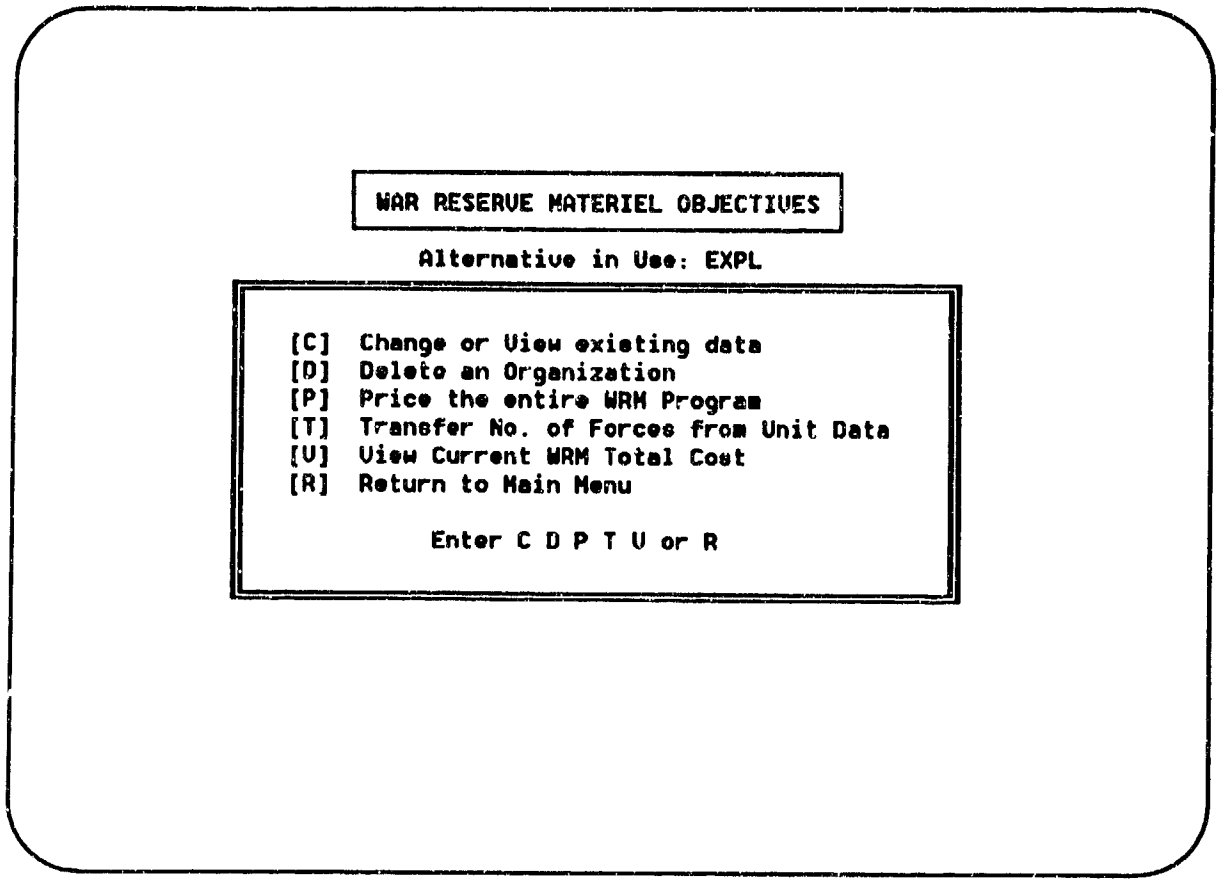


Figure IV-19. WRM Menu

You are not able to add new types of units or equipment to the WRM objectives in this release of the cost model. This WRM database encompasses all units and equipment types for which data are currently available.

1. Changing WRM Cost Factors and Objectives

If you select option C to change data, an overlay menu appears (Figure IV-20) that allows you to select the service to work in and the type of data to work on.

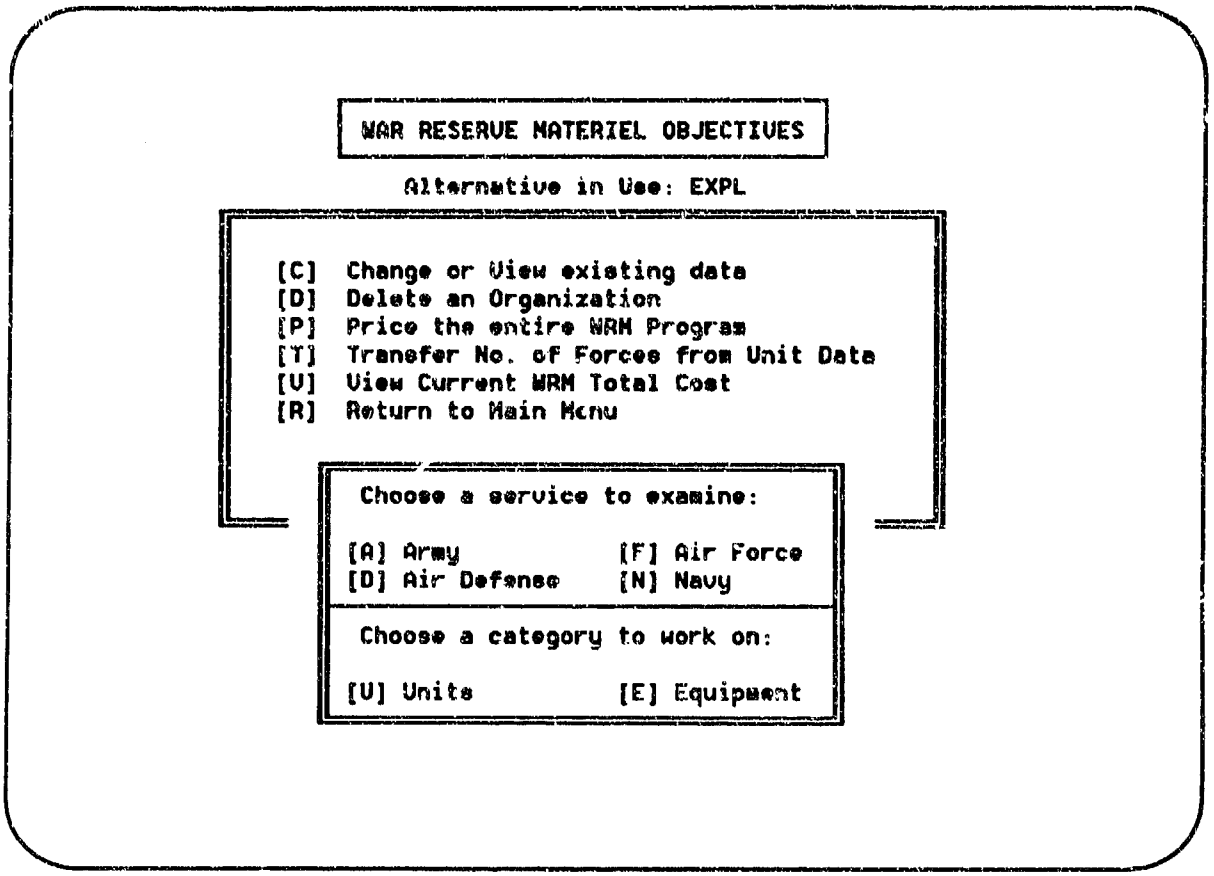


Figure IV-20. Selecting the Service and Category

You first choose a letter corresponding to one of the four services, and then **U** or **E** to further narrow the selection to only units or only equipment. After you have responded to these two prompts, the model lists all the available choices that correspond to your choices. Figure IV-21 shows a picture of the screen that lists the available units following a choice of Army as the service and units as the data type.

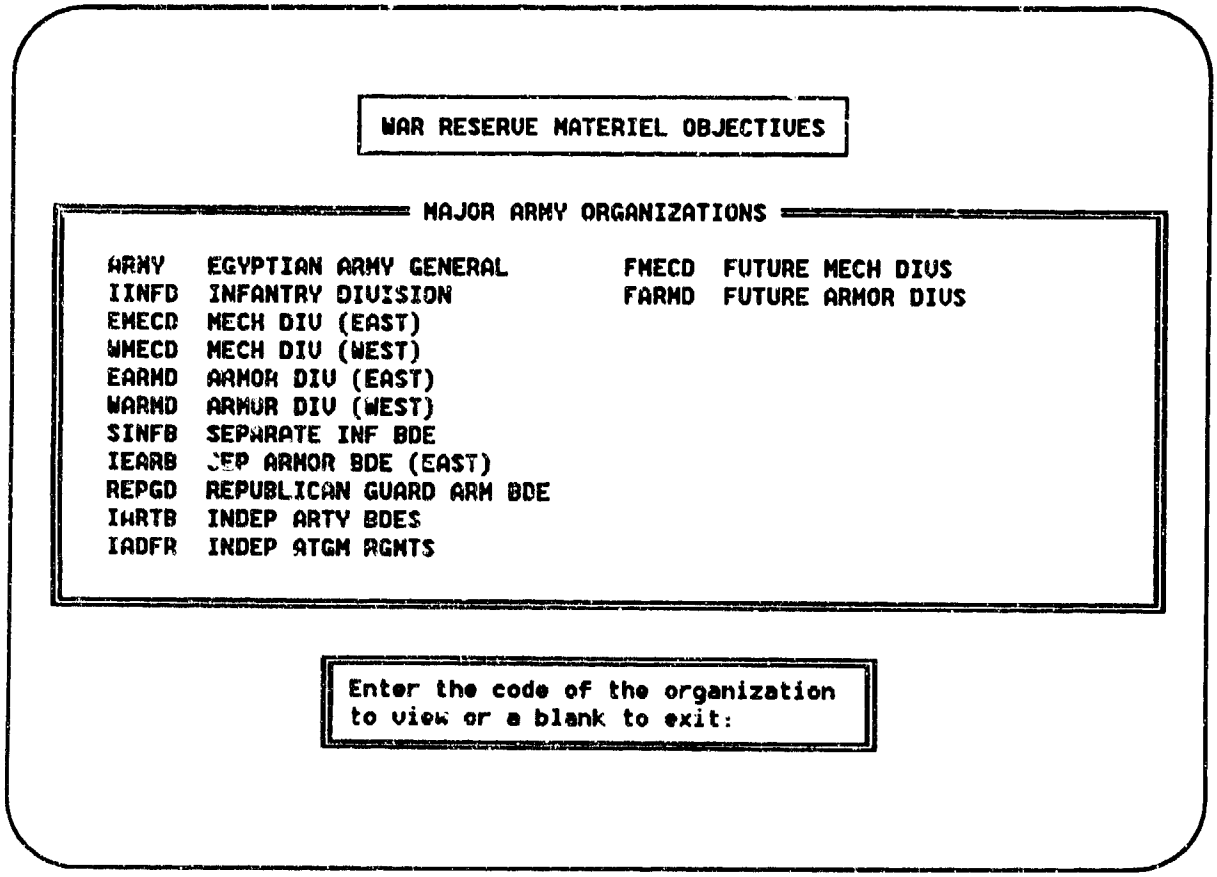


Figure IV-21. Selecting a Unit to Change

After you enter one of the listed organization codes, the model displays all of the WRM data related to that unit. Figure IV-22 shows a picture of this screen. This screen displays the WRM cost factors in the upper right part of the screen, the current number of units of the selected type that have been transferred into the WRM database, the number of days of supply objective by year, and the costs that result from these data. The display in the upper left corner tells you what unit you are editing (`Current`) and the entries immediately before and after the current entry that you can select to work on next. You may revise the title, the cost factors, and the days of supply objectives from this screen. You may also select the adjacent records to continue editing without returning to the WRM Menu.

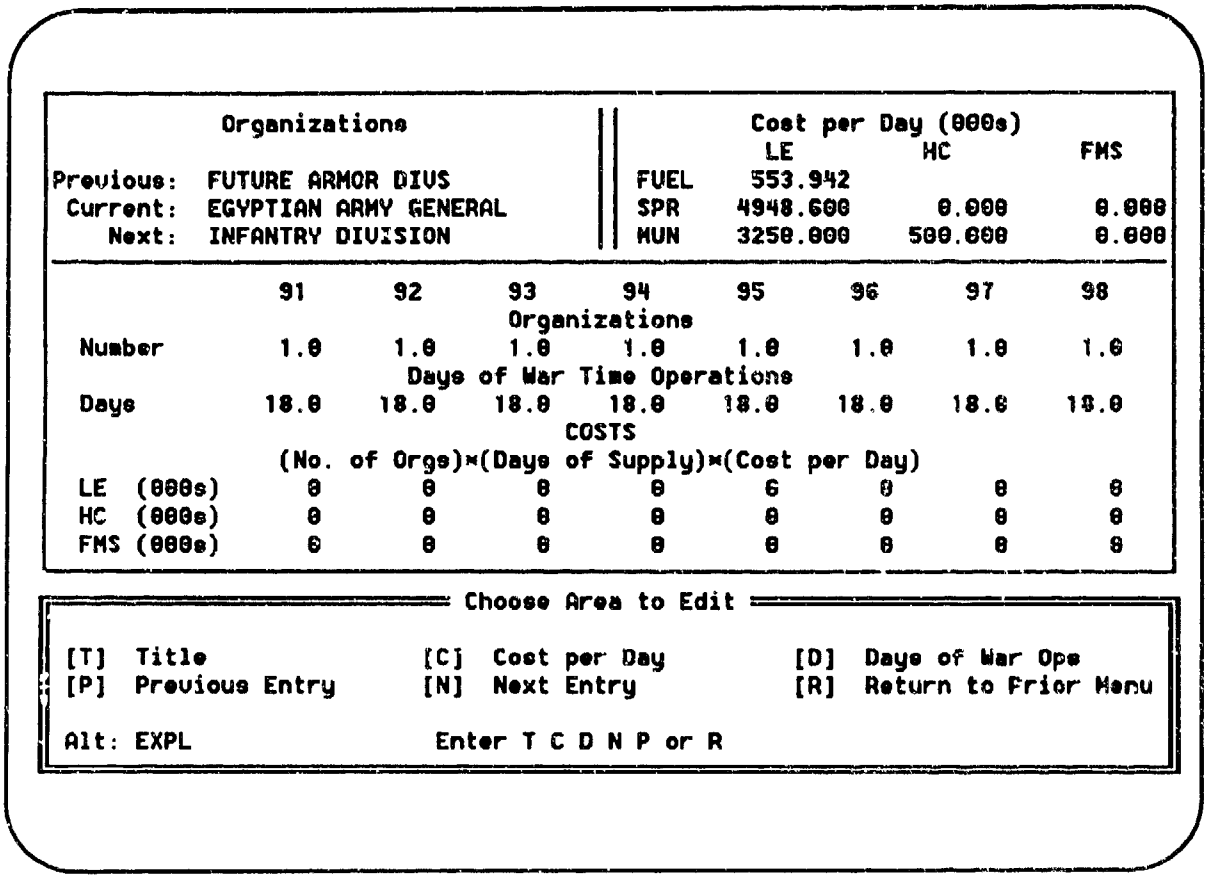


Figure IV-22. Edit Screen for WRM Data

You return to the WRM Menu by entering **R**.

2. Deleting a Type of Unit or Equipment from a WRM Database

When you choose to delete units or equipment from an alternative's WRM database, you provide a service and data type input just as when you select data to edit. First select **D** from the WRM Menu and then choose a service and either a unit or equipment type. The screen shown in Figure IV-23 appears.

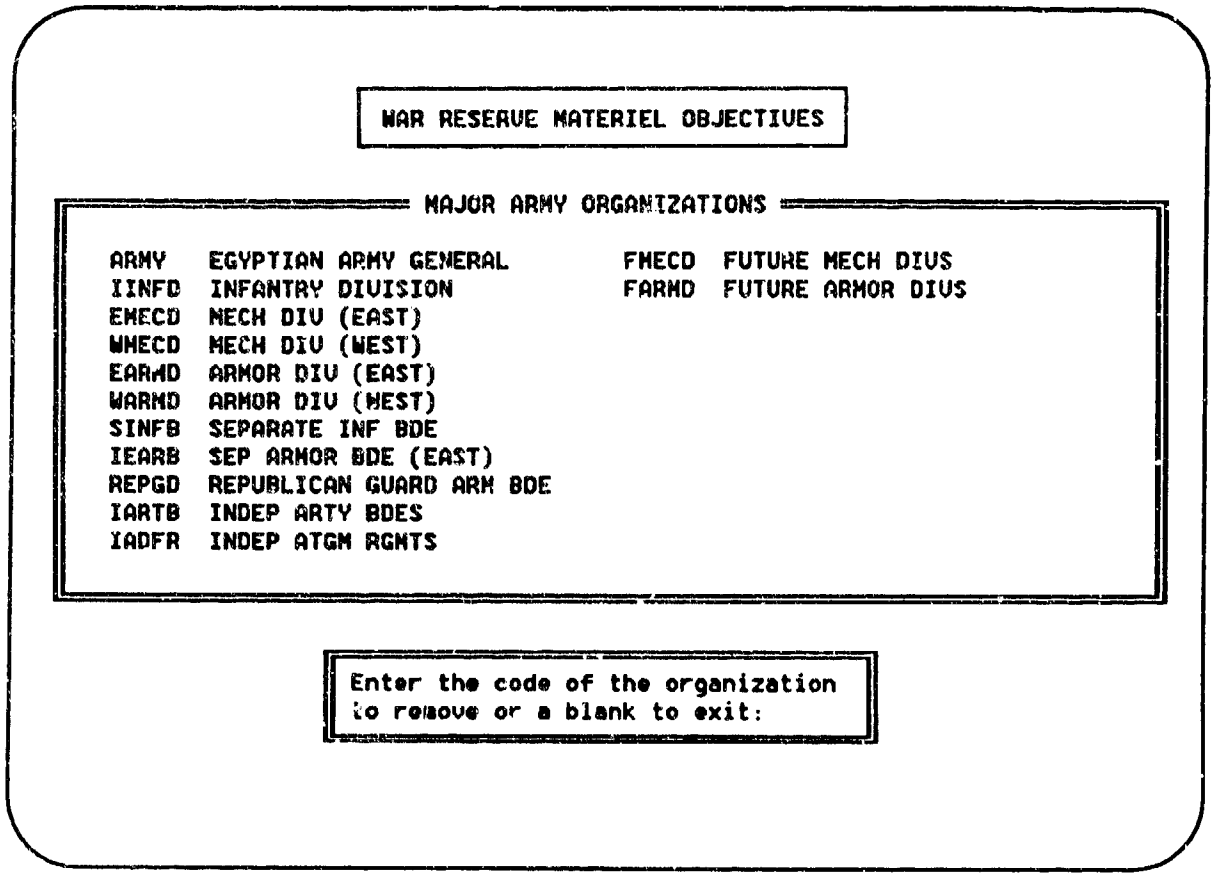


Figure IV-23. Selecting a WRM Unit or Equipment Type to Delete

If you want to delete one of the displayed unit or equipment types, enter the code and press RETURN. If you change your mind about deleting a record, you may exit by pressing RETURN with all blanks in the response block. After the action is completed, the model returns you to the WRM Menu. If you enter blanks, no action is taken and the model returns to the WRM Menu.

3. Pricing the Entire WRM Program

When an alternative is initially created, the data on WRM objectives and costs per day of operation for each type unit and equipment is merged with the actual number of units and equipment items in the new forces database. These three factors interact to determine the WRM requirements. If any of these three factors change, the WRM requirement should be recalculated. The only way to do this after an alternative is created, is to select option **P** (`Price the Entire WRM Program`) from the WRM Menu. If the number of units or equipment items has been changed since the last time the WRM program costs were recalculated, you should transfer the new quantities to the WRM database using the transfer option described in the following subsection.

4. Transferring Unit and Equipment Quantities to the WRM Database

By selecting **T** from the WRM Menu, you initiate a process that summarizes the units and equipment in the active forces database and transfers that information to the WRM unit totals. This process *does not* recalculate the WRM costs. Select WRM Menu option **P** (`Price the Entire WRM Program`) to reprice the WRM program if no additional changes in WRM objectives or WRM cost factors are required.

5. Viewing the Total Cost of WRM Requirements

From the WRM Menu you may choose to see an accounting of the total costs of the WRM program as currently defined in the WRM database for the alternative on which you are working. If you select option V (`View Current WRM Total Cost`), a screen will appear (Figure IV-24) that displays the annual total funding requirements for supplies purchased with Egyptian pounds (LE), hard currency (HC), and FMS credits (FMS).

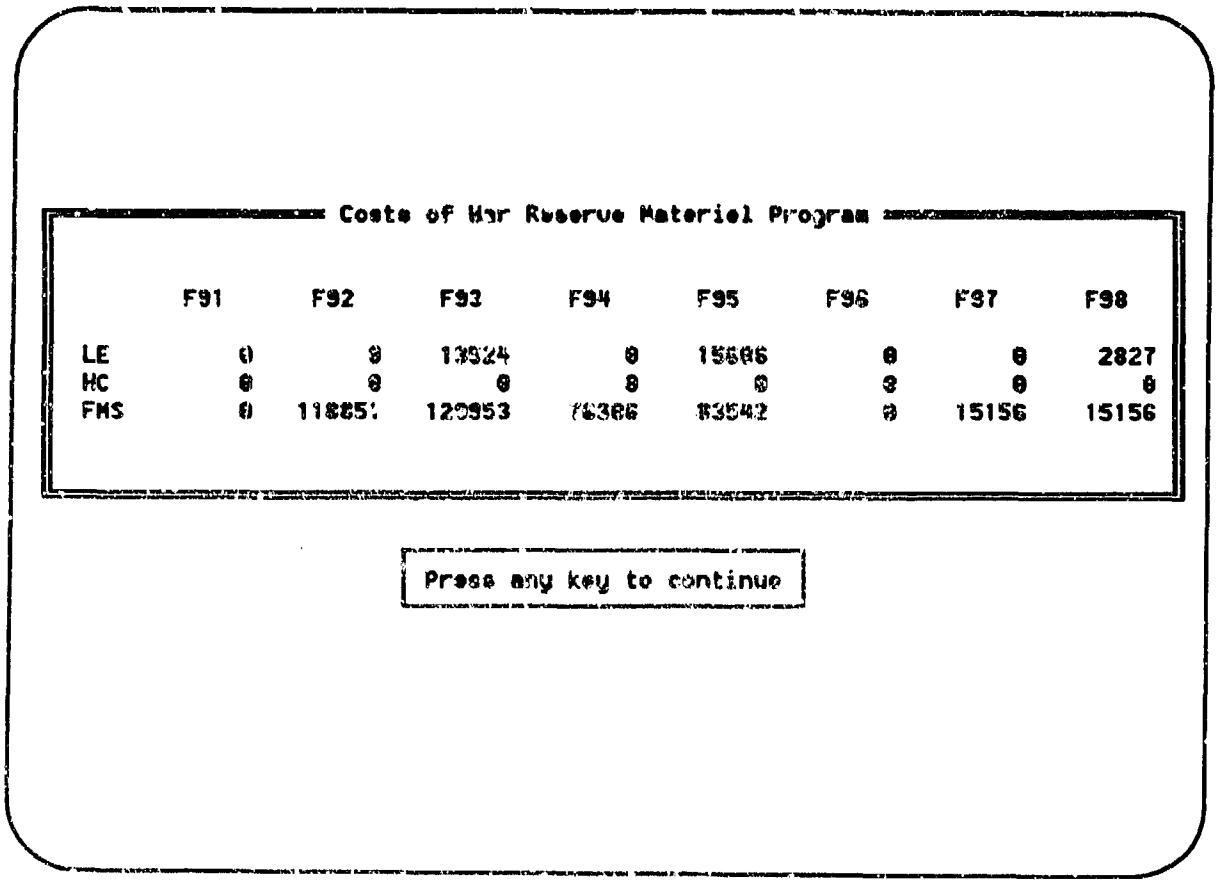


Figure IV-24. Display of the Total WRM Program Costs

Press any key to return to the WRM Menu.

G. FOREIGN MILITARY SALES PROGRAM DATA

From the cost model's Main Menu, enter an **F** to open the FMS procurement programs module. In this module you are able to access the data pertaining to the procurement of new systems funded with FMS credits. *The prices reflected in this module are to be used for planning purposes only and in no way reflect actual costs of a system or constitute an offer to sell any system. Only established FMS procedures may do that.*

The FMS Menu is shown in Figure IV-25. From this menu you may choose to add new programs, delete existing programs, change existing programs, price all FMS programs, or return to the cost model's Main Menu. The first three options involve simply adding, deleting, or changing a program in the list of potential FMS projects available in the particular alternative in which you are working. When you choose to price the FMS programs, the total costs for all aspects of FMS funding are presented.

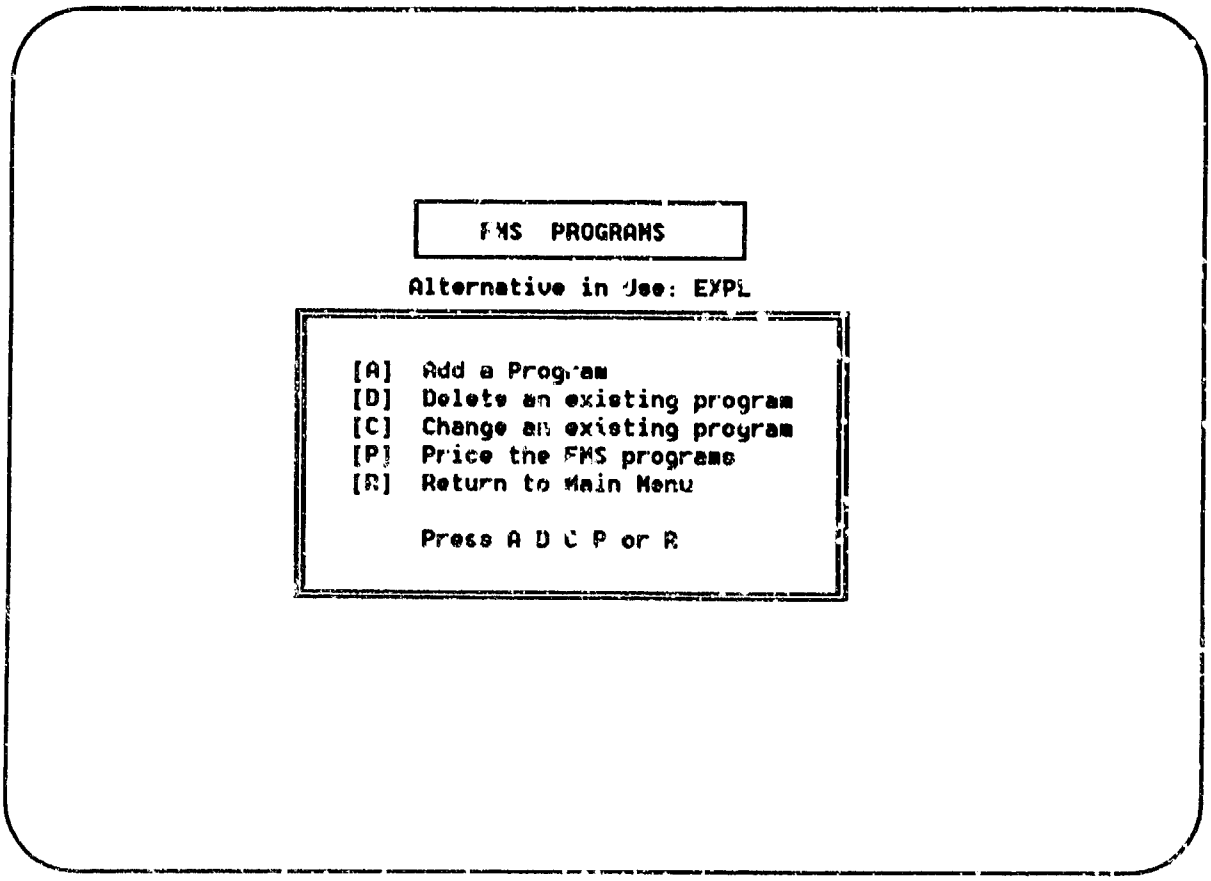


Figure IV-25. FMS Menu

1. Add an FMS Program

Each alternative includes a list of many different potential FMS procurement programs that may be applied to the alternative. At times you will want to add a program that is not currently in the list of possible projects to a specific alternative. By selecting an **A** from the FMS Menu, you cause an auxiliary window to appear at the bottom of the screen, as in Figure IV-26. At this point, you need to identify how you will enter information on the new program. If you intend to provide a unit cost and the quantities to be delivered each year, select option **Q**. If you want to enter the funding requirements year by year, select options **F** or **T**. If you have the costs for the project in future (i.e., then-year) prices, select **T**. The model will automatically calculate the constant-dollar amounts from the prices you provide. If you prefer to enter the costs in terms of 1991 prices, select **F**. The model will calculate and display the then-year costs.

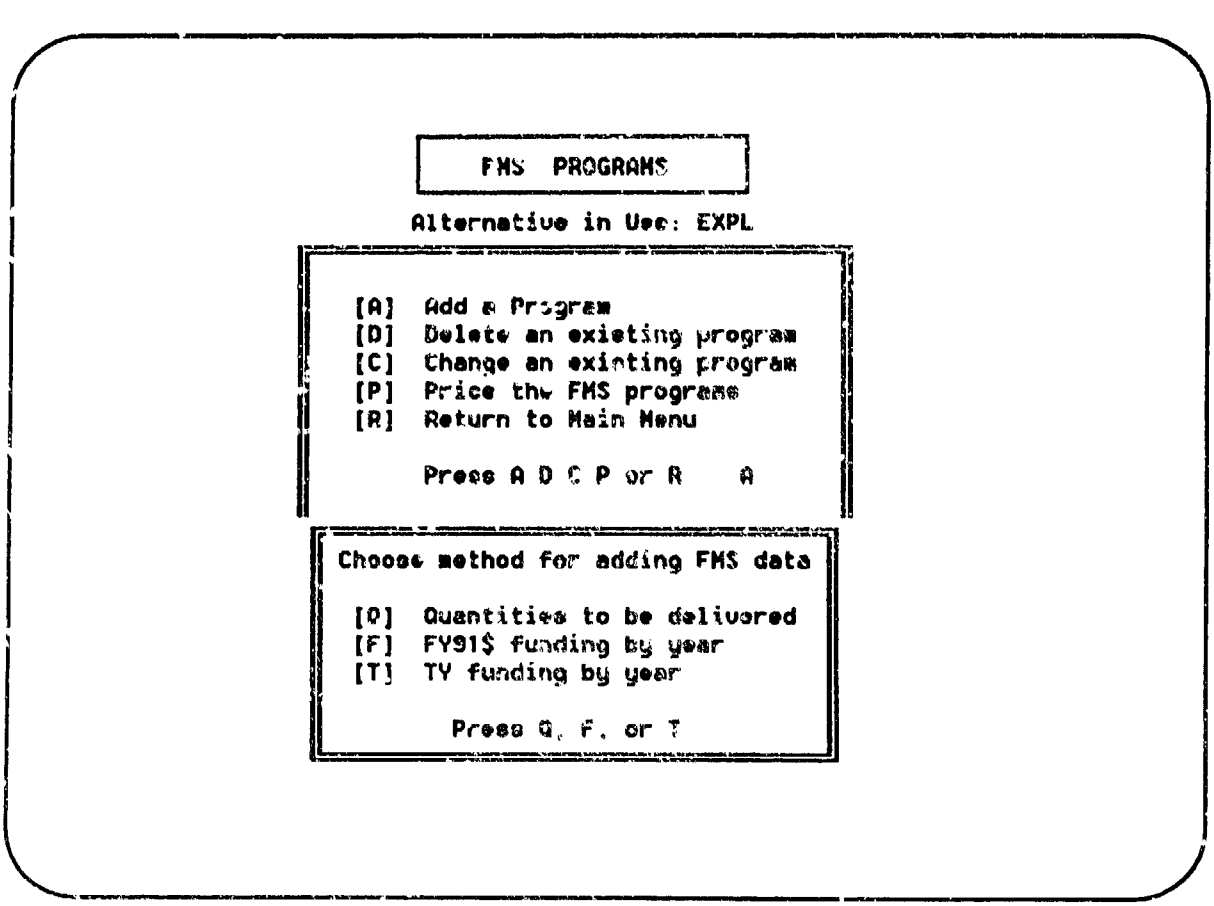


Figure IV-26. Selecting a Method for Adding an FMS Program

After you select a method for entering cost data, the model asks for the name you want to attach to the new program. After you enter a name, the model asks you to confirm it before proceeding. Figure IV-27 shows how this dialog box looks on the screen.

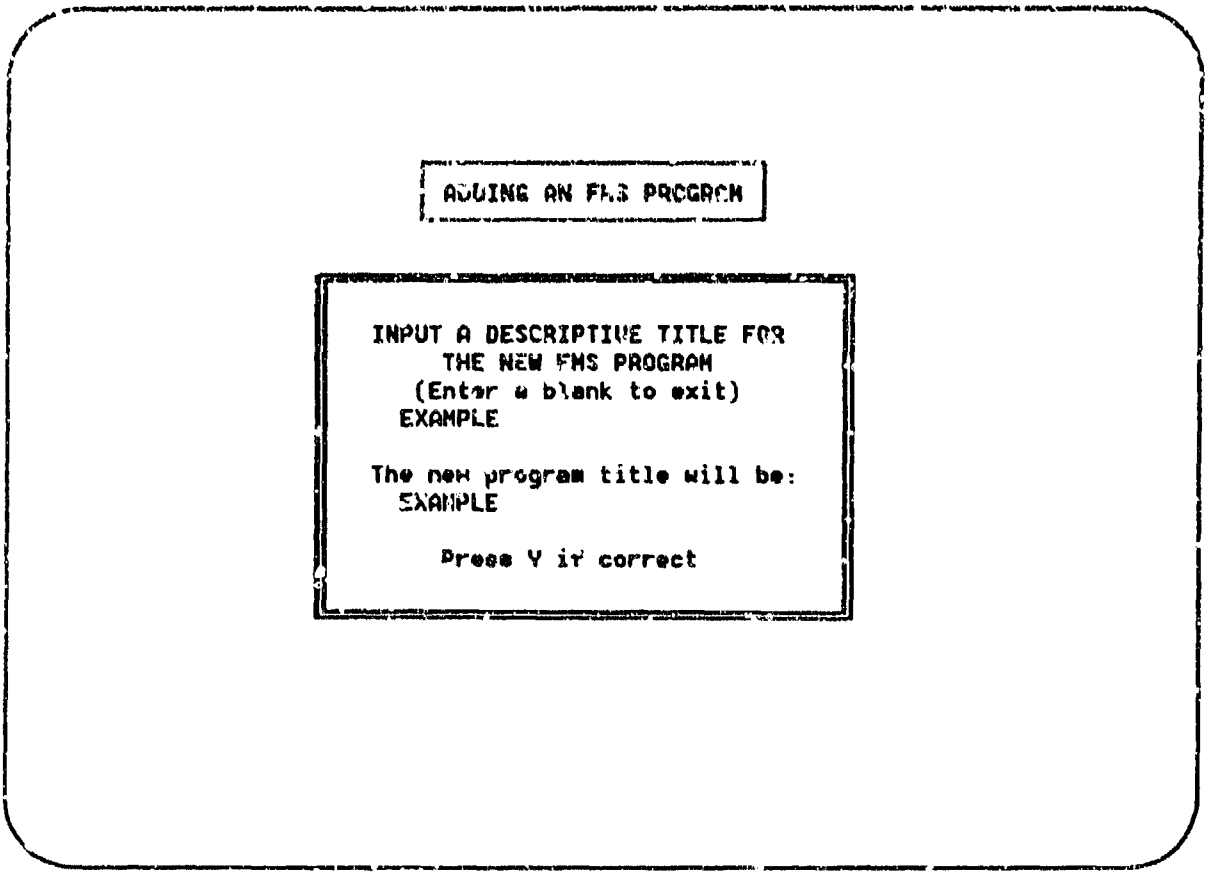


Figure IV-27. Naming a New Program

After you have provided a project name, the model asks you to identify the service that will receive the equipment. At this point, you enter the cost information and delivery quantities, if appropriate. These data may be edited later just as any other FMS project. Next, the model asks you for other relevant identifying data concerning the new project. When you are finished adding the program, the status is set to "included." Remember, the new FMS project is appended to the list of potential projects for only the current alternative. No other alternatives will have this project available unless you either add it manually to each alternative or add it to the baseline listing of potential projects and then rebuild the alternatives.

3. Deleting an Existing FMS Program

If it is necessary to actually delete a project from the list of potential programs, select D from the FMS Menu. A message screen appears with instructions on how to mark the projects for deletion and how to indicate to the model to proceed. The model next displays the titles of all projects and permits you to mark those you want to delete. You may delete any number of projects at the same time by placing a T next to the title of all those you want to remove. The field indicating whether the project is "included" for the current alternative is also displayed. This may help in deciding which projects to remove. Use the UP ARROW and DOWN ARROW keys or the PAGE UP and PAGE DOWN keys to move throughout the list of programs. After you have marked all the projects you want to delete with a T, press F2 to tell the model to proceed with deleting those projects.

The model erases the projects you have marked for deletion. Deleted projects cannot be recovered, so make certain you really want to remove the projects you mark. In practice, it should rarely be necessary to delete a project from an alternative's listing of potential projects because marking it as excluded in the editing mode (see the next subsection) ensures that it is not included in the calculation of FMS costs.

2. Editing Data on Existing FMS Programs

Every FMS project on the list of potential FMS programs has many characteristics that you may change. By selecting C from the FMS Menu, you may change any of the following:

- "included/excluded" status indicator,
- project's title,
- project's identifying categories,
- unit cost assumption,
- expenditure profile type (controls the payment profile),
- quantity to be delivered each year, and
- annual funding if the unit cost is zero.

The model allows you to select a subset of the FMS programs to edit. Figure IV-28 shows you these choices.

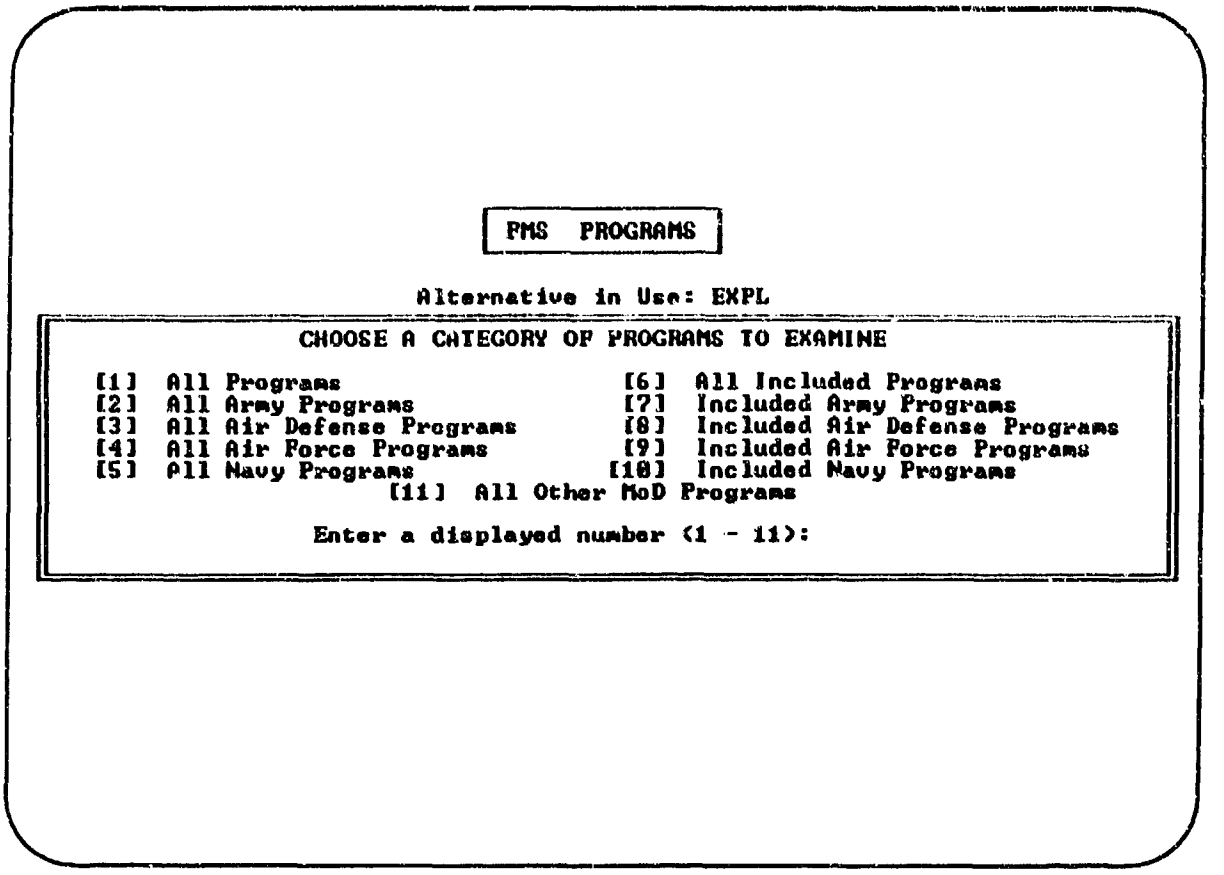


Figure IV-28. Selecting a Category of FMS Programs to Edit

After you have specified one of these choices, the model displays the first program in the list that meets the criteria of your selection. The upper part of this new display screen (Figure IV-29) provides the current values of all of the characteristics of a program including its current selection status (i.e., included or excluded). This status indicator signifies whether or not this program's costs are included in the total FMS program costs. The lower right part of the display provides information on the total quantities and costs for the displayed program. The lower left portion provides a menu of editing options.

By selecting **T**, you may edit the existing title. You change the selection status indicator between "included" and "excluded" by pressing **C**. The model associates each procurement program with one of several general categories of FMS sales used by DSAA. To change the FMS category, select **F**. A list of valid entries is displayed from which you may choose a new category. If you select **E** to change the expenditure type, the model lists all of the currently defined expenditure types and you choose the one that best applies to the program.

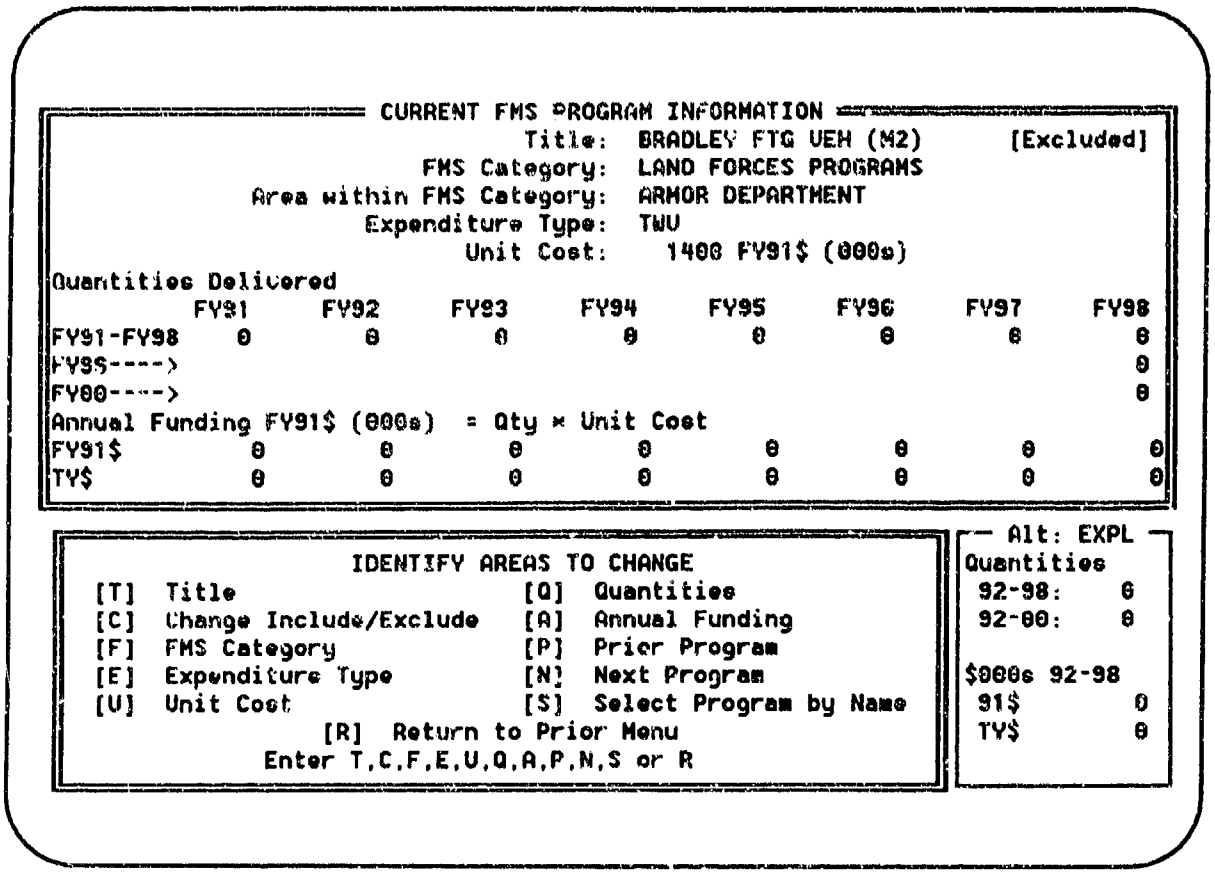


Figure IV-29. Edit Screen for FMS Program Data

To change the current unit cost assumption, select **U**. If you set the unit cost to zero, then the model assumes that you prefer to describe this program's cost in terms of a specific year-by-year funding profile. If the unit cost is zero, you may select option **A** and enter year-by-year cost data in either then-year or constant FY 1991 prices. Note that this option is available only if the unit cost is zero. To change the quantities procured each year, select **Q**.

Options **N** or **P** display the next or prior program in the list that conforms with the selection criteria you choose earlier. If you select option **S**, you can enter part of a program's title, and the model will find the next project that has those characters in the title. For example you could enter **COAST** and the model will locate the option titled COASTAL MINE HUNTER. However, if you entered **MINE** instead, the model might find MINE SWEEPERS first, in which case you would need to search again on the same key. You may find the next occurrence by selecting option **S** again and pressing the RETURN key. If you enter characters that do not appear in a name, the model will return to the entry you were last examining before you chose to search.

To return to the FMS Menu, press **R**. All changes you have made are saved.

4. Price and Summarize All FMS Costs

If you select **P** from the FMS Menu, the model will summarize the FMS costs of every part of the alternative. The resulting screen looks like Figure IV-30. This screen presents the total costs of the included portion of the alternative's modernization program under the heading, `FMS Programs Not Yet Signed`. This is the total of the projects marked as included. The cost of the cases already signed are summed from the FMI_BASE database, as shown in the next two rows. The lower part of the display contains the total cost of the WRM and peacetime operating portions of the FMS program. Under the heading `All FMS Requriements` is the total FMS requirement by year as well as a grand total.

EXPL — FMS PROGRAM COSTS (in Millions)

	F92	F93	F94	F95	F96	F97	F98	TOT
FMS Programs Not Yet Signed								
FY91$	0.6	3.4	3.3	85.6	124.1	200.1	0.0	417.1
TY$	0.6	3.7	3.7	100.0	150.0	250.0	0.0	508.0
Signed FMS Programs								
FY91$	1576.3	1312.6	1115.2	682.3	281.0	37.1	3.3	5007.9
TY$	1645.7	1426.5	1256.8	796.7	339.6	46.4	4.3	5516.0
WRM Spares and Munitions								
FY91$	118.9	130.0	76.3	83.5	0.0	15.2	15.2	439.0
TY$	124.1	141.2	86.0	97.5	0.0	18.9	19.6	487.4
Operating Spares and Munitions								
FY91$	74.3	113.1	113.1	130.6	130.6	130.6	150.8	843.0
TY$	77.5	122.9	127.5	152.5	157.8	163.2	194.8	996.2
All FMS Requirements								
FY91$	1770.1	1559.0	1307.9	982.1	535.7	382.9	169.2	6707.0
TY$	1848.0	1694.4	1474.0	1146.7	647.4	478.5	218.7	7507.6

Press any key to continue

Figure IV-30. Summary of FMS Costs

H. OTHER PROJECTS DATA

The Projects module is used to record costs that are not contained in any of the other model categories. You enter the Projects module by pressing **P** from the Main Menu. Figure IV-31 shows the Projects Menu that appears if at least one project already exists. If no project data has been entered, the model skips the Projects Menu and the first screen that appears allows you to add a project to the database (Figure IV-32).

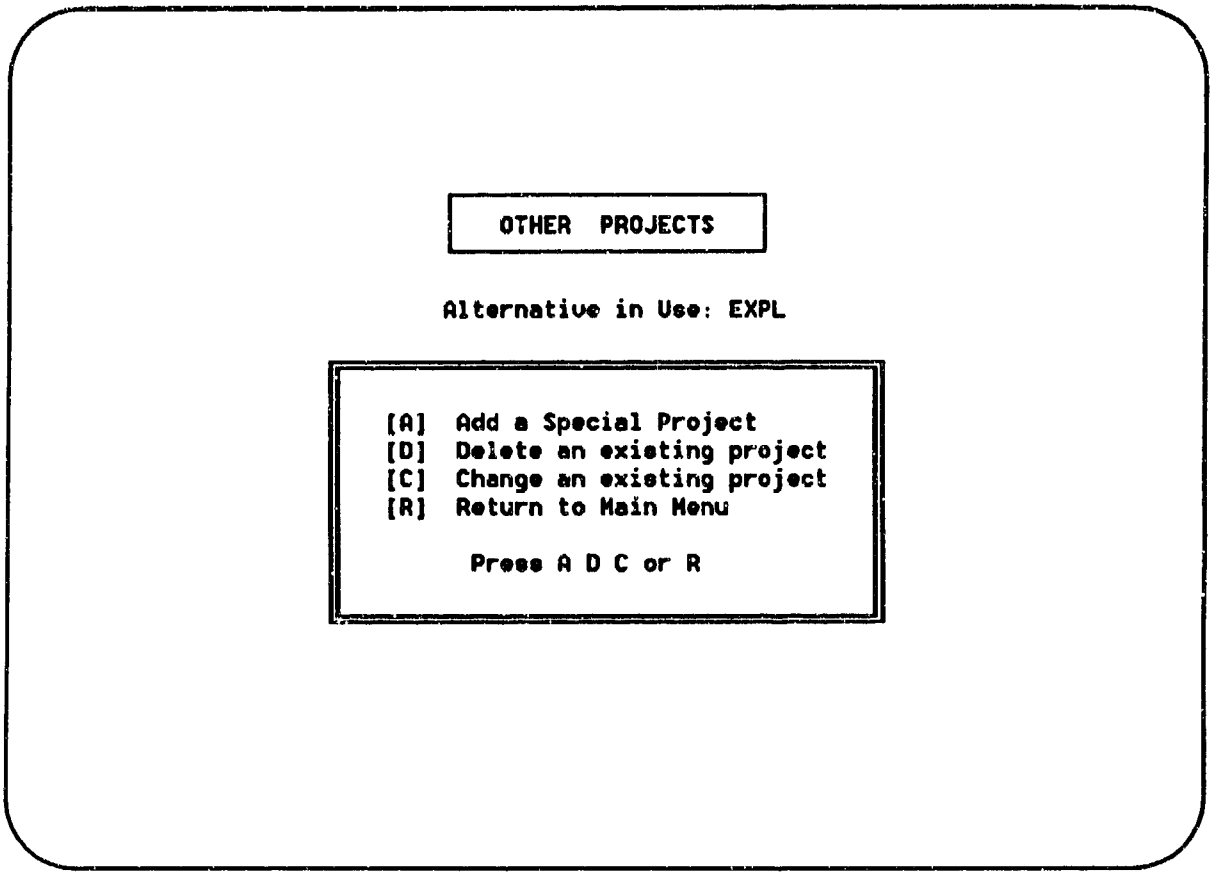


Figure IV-31. Projects Menu

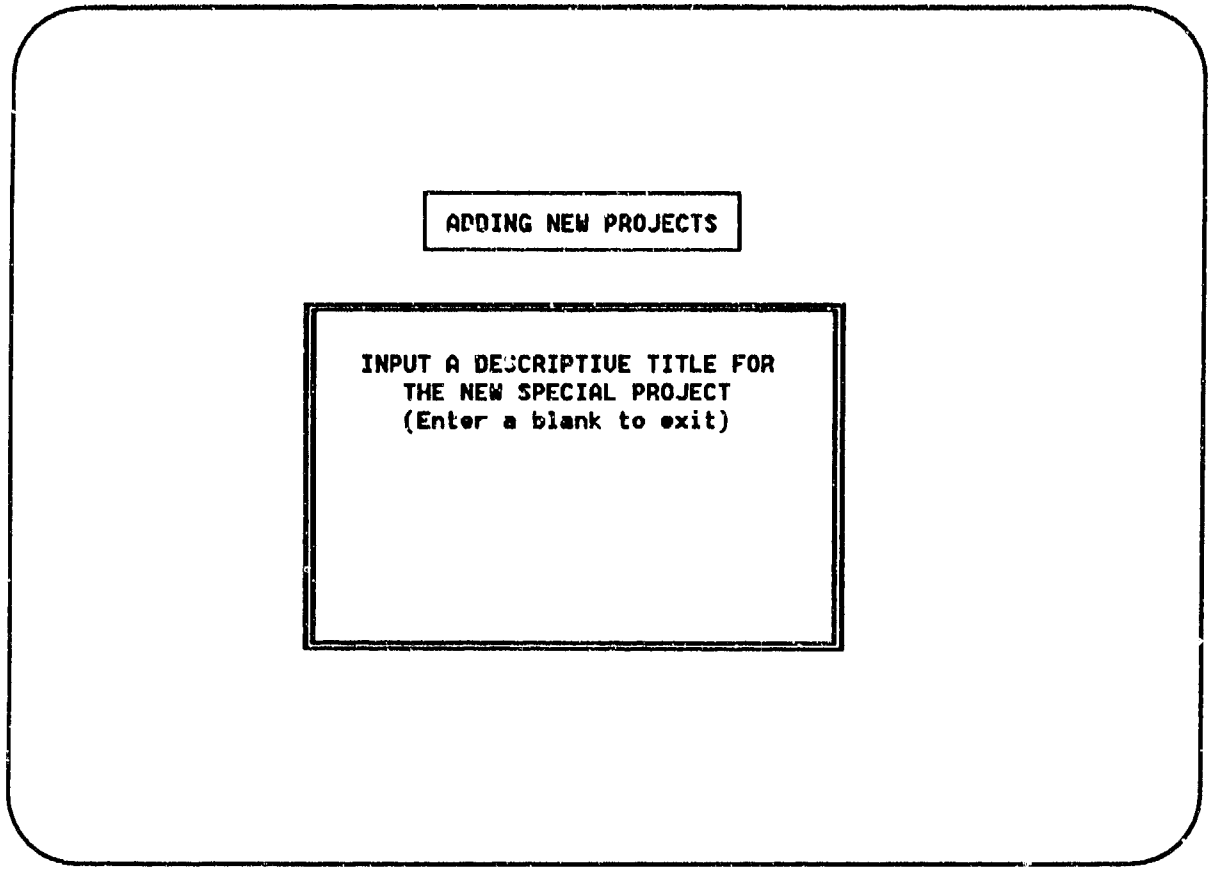


Figure IV-32. Adding a Project

When you add a new project, you are prompted to enter a title for the new project. In the event that you do not want to add a project, simply press the return key without entering a title. This automatically closes the module and returns you to the Main Menu.

1. Adding a New Project

To add a new project, enter **A**. You create a new project by providing a project title and then providing additional descriptive data through the standard Project Data Editing screen (see Figure IV-33).

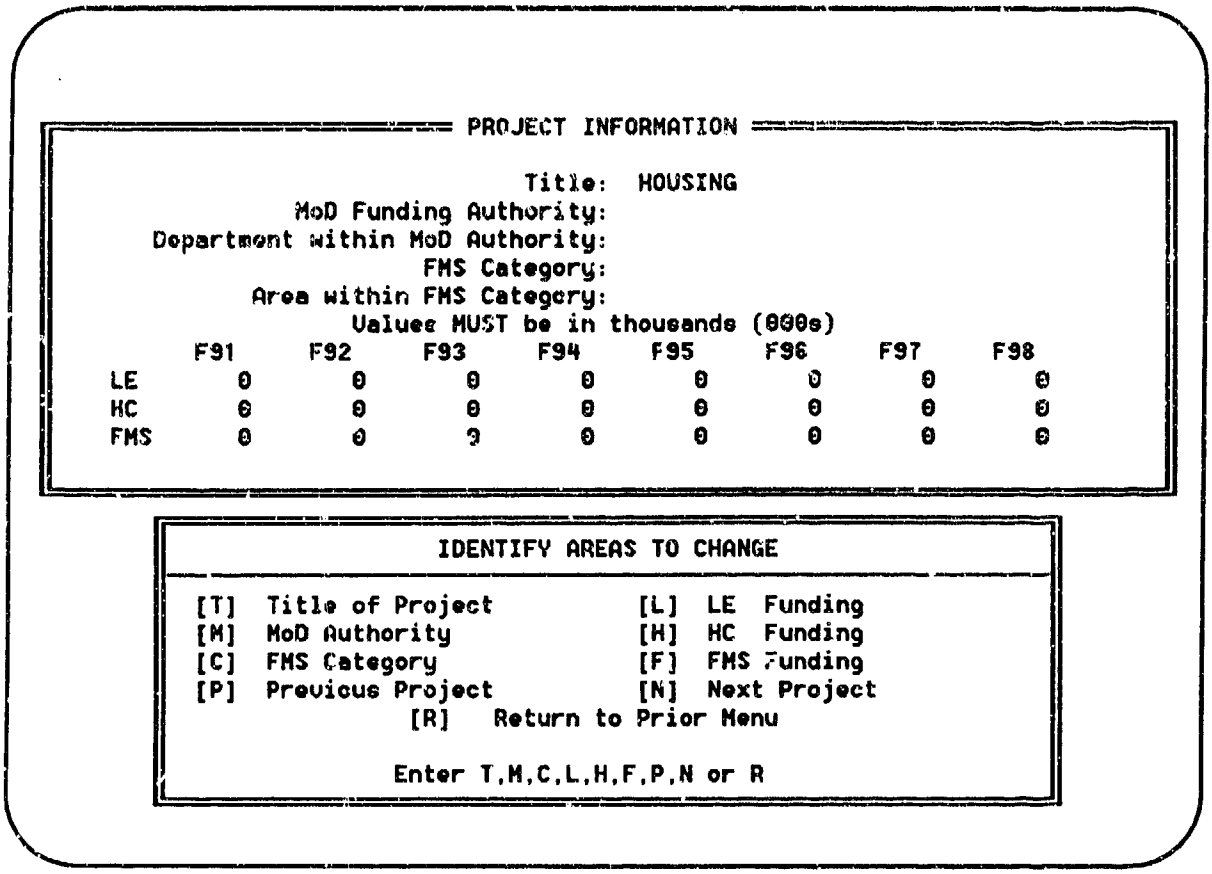


Figure IV-33. Project Data Editing Screen

2. Deleting an Existing Project

When you select **D** to delete an existing project, you will see an introductory screen that tells you how to mark the projects you want to delete and then a list of all the projects in the alternative. You place a **T** next to the project titles you want the model to delete. When you are finished marking all of the projects to be deleted, press F2 to tell the model you are done, and the model automatically deletes those entries.

3. Changing an Existing Project

When you select option **C** to change or edit an existing entry, a list of existing projects is displayed. Place a **T** next to any projects you want to edit. After you have marked these records, a screen like that shown in Figure IV-33 appears. (This is the same screen you see after you enter the name of a new project.) At this point you may change any data that you wish.

Options **L**, **H**, and **F** give you access to the data on the funding requirements. Options **P** and **N** permit you to move to a prior project or the next project, provided that other projects exist and have been marked to be edited. Option **R** returns you to the cost model's Main Menu.

I. CALCULATIONS FOR PEACETIME OPERATIONS

Enter **C** at the cost model's Main Menu to begin the process of calculating peacetime operating costs. This is a lengthy process that proceeds through many steps. The model calculates total manpower and optempo for each unit and equipment type to ensure all of the changes in unit and equipment quantities and in manpower and optempo factors have been included. Once these totals are created, costs are calculated for fuel, training munitions, fixed operating support, MoD pay, indirect personnel support, and spare parts and supplies.[5] The results of the calculations are saved in a cost database (see Section VI, Databases, for further information) and used to generate various reports.

As the calculation process proceeds through each step, its progress is written to the screen as shown in Figure IV-34. When finished, it pauses and waits for you to press any key before it returns to the Main Menu.

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[5] More information concerning these calculations is available in Section II.B.

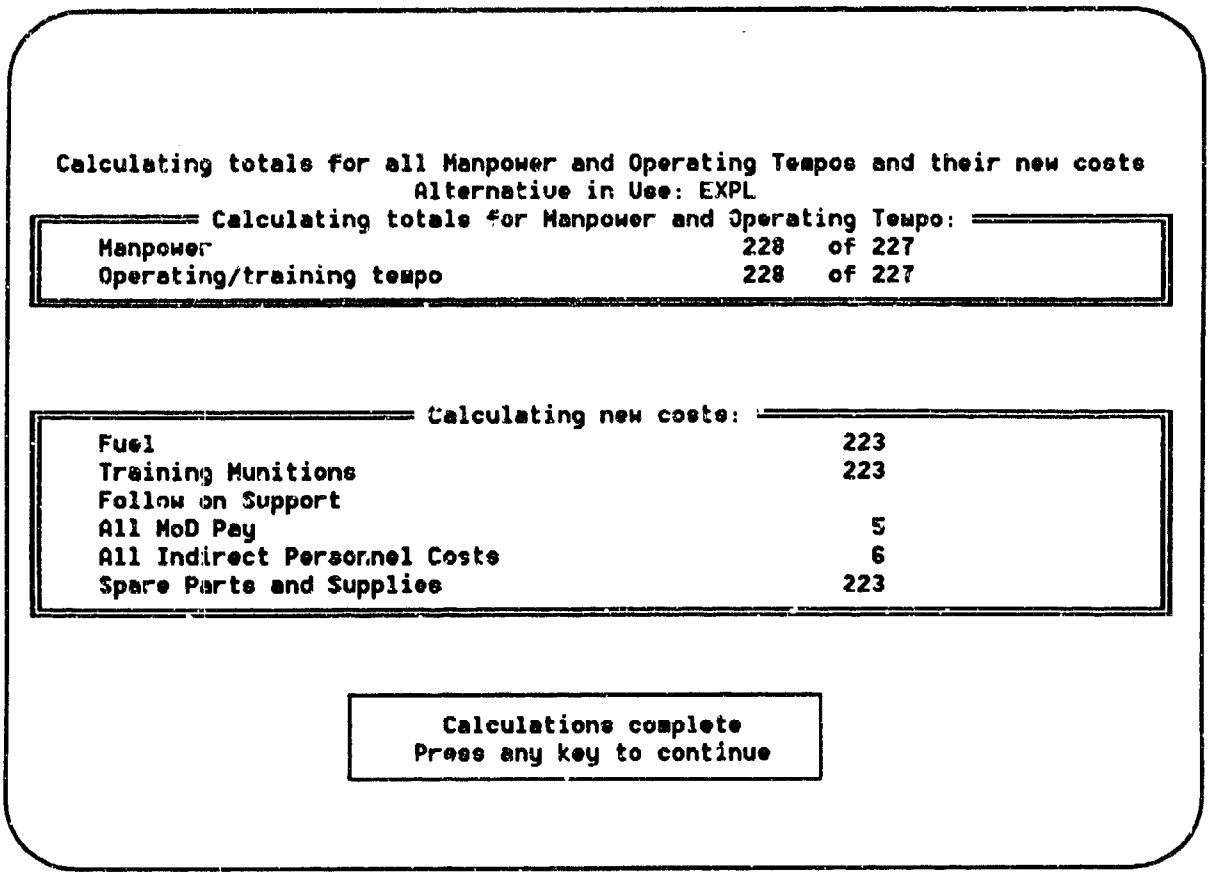

Figure IV-34. Calculation Progress Screen

The calculation option is the only means available in the cost model for calculating an estimate for the total peacetime operating costs of the defense forces. This process is run automatically every time a new alternative is built and only needs to be re-run when changes are made. *It is important that you recalculate peacetime operating costs before requesting reports when changes have been made in any of the following areas:*

- quantities of forces or equipment,
- manning levels for forces or equipment,
- operating rates,
- spare parts cost factors,
- equipment-related cost factors (fuel, training munitions, FOS),
- indirect personnel support or MoD pay factors, or
- the inflation assumptions for either Egyptian pounds (LE) or MoD pay.

J. PRODUCING REPORTS

The cost model offers several alternatives for preparing reports of the data in the model. You access all reports by selecting **R** from the cost model's Main Menu. When you have selected this part of the model, the Reports Introductory Menu is displayed. It looks like Figure IV-35. This screen gives you the opportunity to produce reports for any alternative.

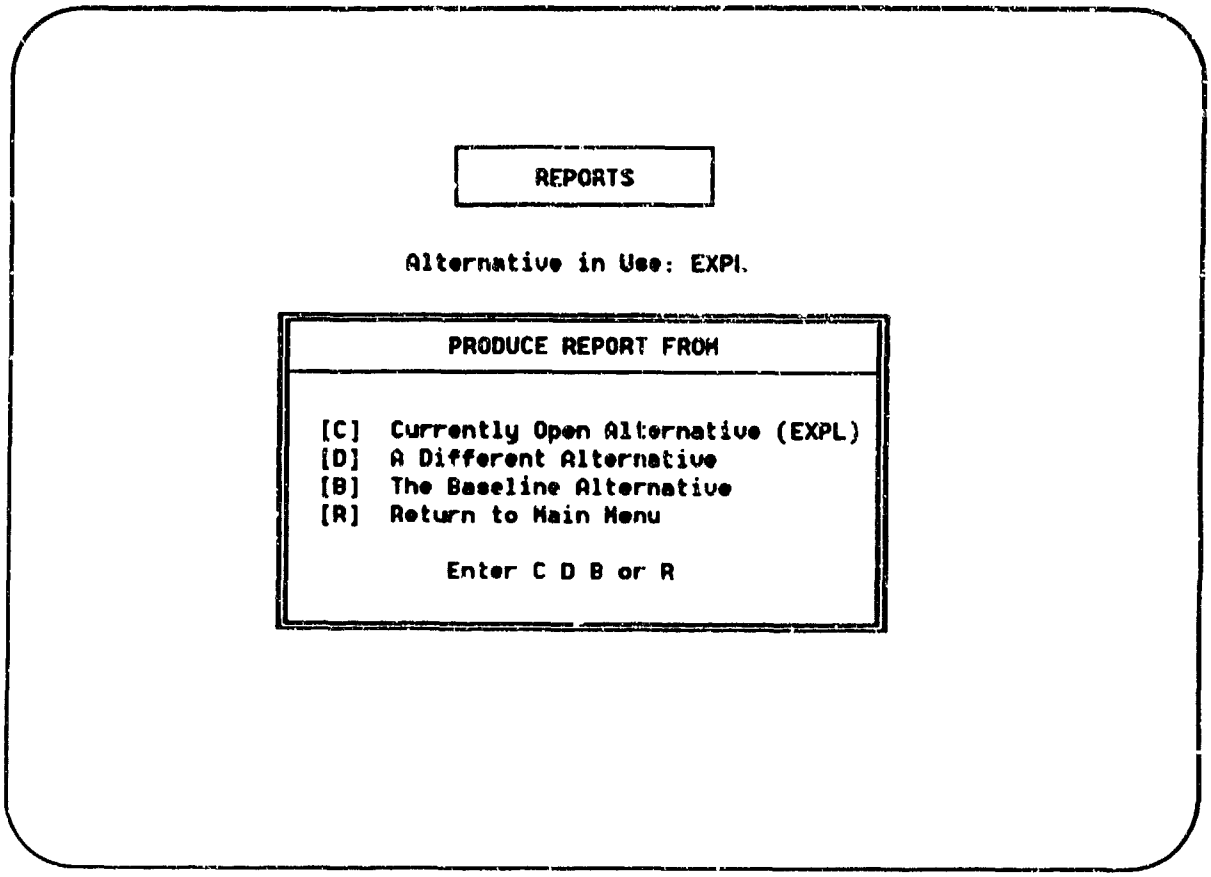

Figure IV-35. Introductory Menu Screen for Reports

After you have specified the alternative from which reports will be produced, the Reports Menu is displayed (Figure IV-36). This menu is divided into four major areas. All reports are requested by a letter that indicates one of these four major categories and a number that identifies a specific report within that area. The upper left part of the screen contains reports that summarize the equipment, forces, and total manpower in an alternative. To the right is a list of five report options that provide cost dat... The lower left portion of the screen contains reports on the unit characteristics that affect costs, manning and optempo factors. The lower right part of the screen lists reports that documenting the specific cost factors used in making the cost calculations.

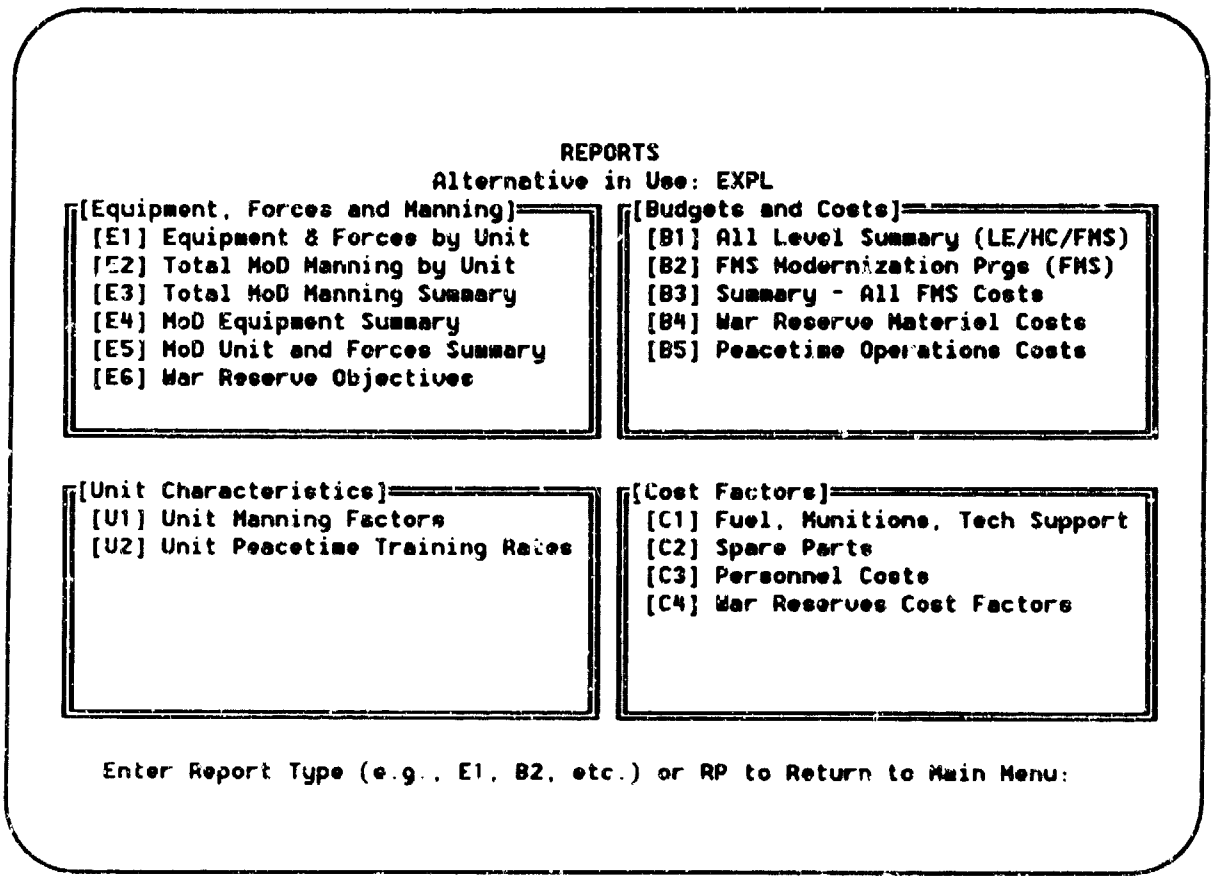

Figure IV-36. Reports Menu

K. QUITTING THE MODEL

At the cost model's Main Menu, enter **Q** to quit. This initiates a process that confirms your desire to quit, and provides alternative actions. Whatever action you choose, all changes made while using the cost model are saved automatically. Figure IV-37 shows the exit screen.

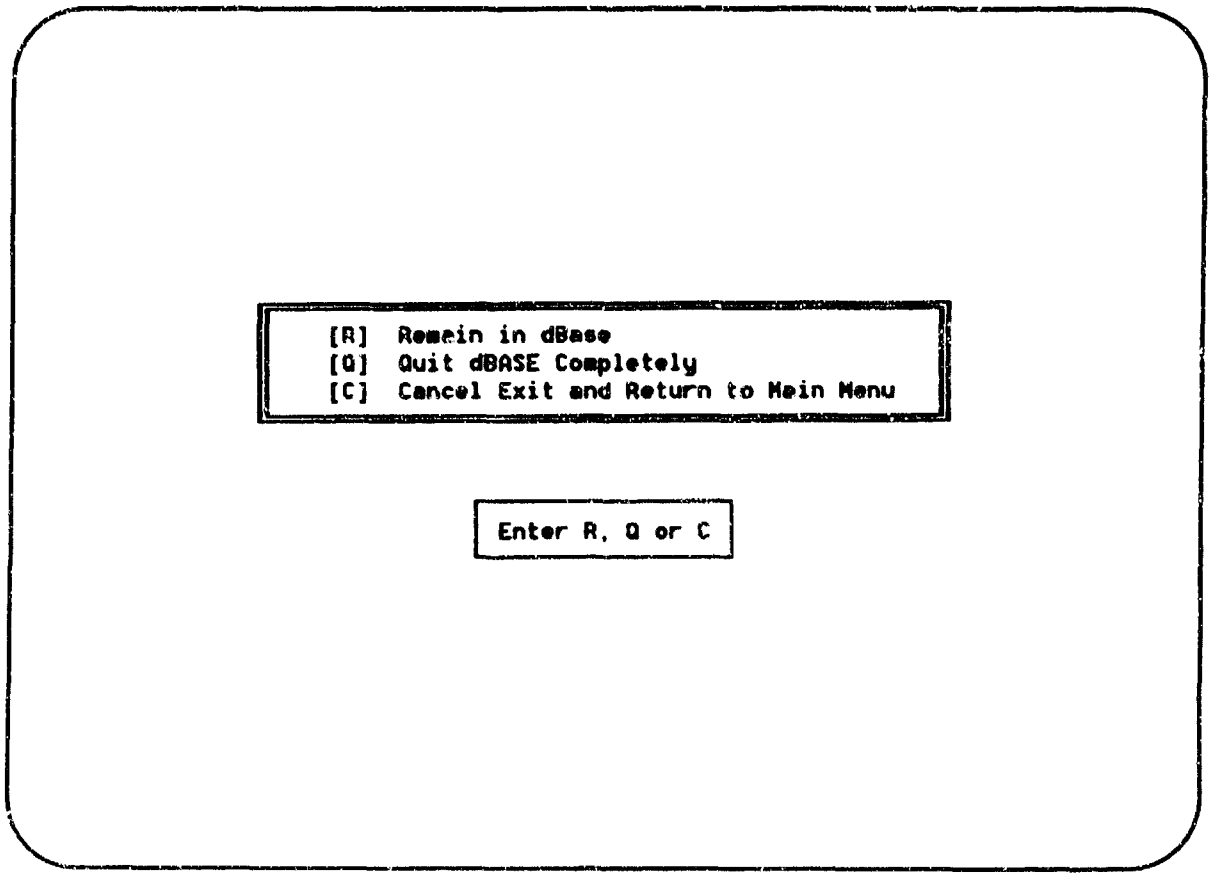

Figure IV-37. Exiting the Cost Model

Your choices at this point are to `Remain in dBASE` (**R**), `Quit dBASE completely` (**Q**), or `Cancel Exit and Return to Main Menu` (**C**).

If you remain in dBASE, the cost model is closed and the initial entry screen is displayed once again. This reminds you that all that is required to re-enter the model is to press F10. However, most other aspects of the model are closed. The alternative last in use before you quit the model is still open and its databases are present in the various work areas. Even if you open and use other dBASE files and then wish to return to the model,

you do not need to close down all open databases, simply press F10. The model cleans up the dBASE environment and prepares everything that is needed.

The `Cancel Exit and Return to Main Menu` option allows you to return to the cost model without exiting. Entering **C** reopens the cost model's Main Menu and reinstates the operating environment as it existed before you exited. No work has been lost and you may continue working as if nothing had happened.

V. MODEL MAINTENANCE

This section provides information on the baseline reference tables (i.e., databases) in the cost model that may occasionally need to be modified. Even though these tables are intentionally not directly accessible to all users, a dBASE III+ program has been included with the model software and can be used by pressing the F9 function key any time *after* the cost model itself has been used. Figure V-1 shows your choices after you activate the Model Maintenance module.

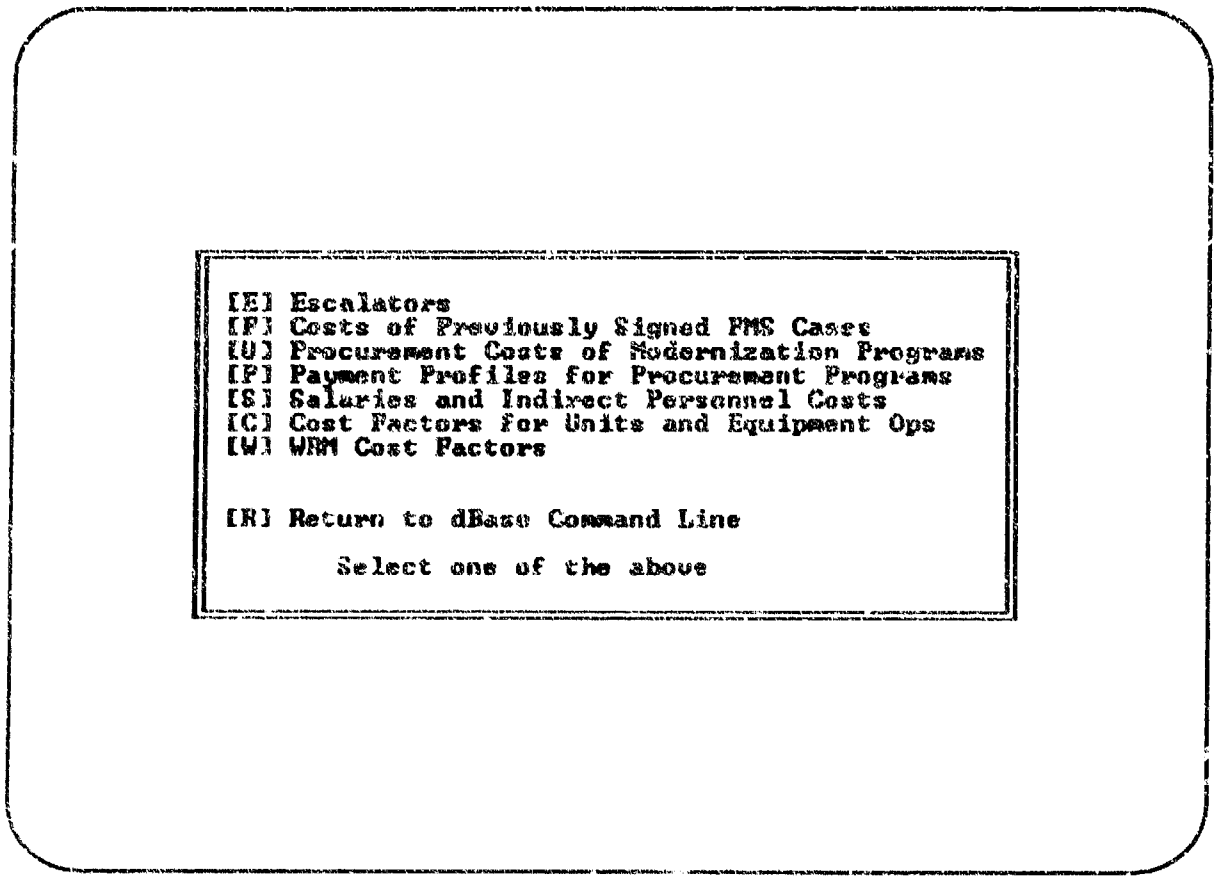

Figure V-1. Model Maintenance Menu

We strongly advise against modifying the databases described in this section directly from the dBASE III+ command prompt level. The maintenance program provided

opens the proper databases, carries out all procedures required to maintain continuity within the model, and provides a convenient way to modify the basic factors and constants that affect cost calculations.

This section describes how to modify the contents of each of these general use tables. Any changes you make will automatically affect future cost alternatives built from an effectiveness database. Changes in escalation rates or in the costs of already signed cases will affect future reports made from currently existing cost alternatives. Changes in the baseline tables with FMS modernization costs, salaries and indirect personnel costs, and peacetime operating costs have no effect on any existing alternative. These types of changes must be made within an alternative if it has already been created. New data on time-phased progress payments do not automatically affect cost calculations already made on FMS modernization or WRM programs in existing alternatives. However, if you want to apply the new profiles to existing alternatives, you may follow the procedures outlined below:

Step 1. Start the Cost Model, press F10

Step 2. Select the desired alternative

- From the Main Menu, press **S** (`Select, Create or Delete Alternative`)
- From the Alternative Selection Screen, press **U** (`Use an Already Existing Alternative`)
- Enter an alternative name and press RETURN
- Press **R** (`Return to Main Menu`)

Step 3. Reprice the total FMS modernization program

- From the Main Menu, press **F** (`FMS Program Data`)
- From the FMS Menu, press **P** (`Price the FMS programs`)

Step 4. Reprice the total WRM program

- From the Main Menu, press **W** (`War Reserve Materiel Objectives`)
- From the WRM Menu, press **P** (`Price the Entire WRM Program`)

Step 4 needs to be performed only if the "MUN" or "SPR" payment profiles were changed. The "MUN" and "SPR" profiles control the time phasing of the payments for spares and munitions in the WRM module.

Table V-1 provides a summary of the baseline reference tables (i.e., databases).

Table V-1. Baseline Reference Tables

Table	Database Name	Contents	Impact on Existing Alternatives
Price Escalators	ESCALATE	Annual and cumulative price deflators	Most recent rates used to calculate then-year version of cost data in reports and screen displays
Costs of signed FMS cases	FMS_TY	Annual payments for each signed case in future prices	Model uses the most recent changes available at all times
	FMS_BASE	Annual payments for each case in constant dollars	
FMS modernization program costs	FMP_BASE	Unit procurement cost and payment profile codes for potential modernization programs	No impact on existing alternatives
FMS payment profiles	EXP_PROF	Fraction of total cost due in delivery year and 3 prior years	No impact on existing alternatives until FMS and WRM costs are recalculated
Salaries and indirect personnel costs	RTS_BASE	Annual salaries for officers, NCOs, and conscripts for each service and cost per person for indirect support by category	No impact on existing alternatives until peacetime operating costs are recalculated
Cost factors for unit and equipment operations	CHR_BAS0 and CHR_BAS1	Optempo, officers, NCOs, conscripts, fuel, spare parts, training munitions, and fixed operating support for every unit and equipment type	No impact on existing alternatives.

A. ESCALATORS

When this maintenance category is selected, the baseline database called ESCALATE is opened and the escalation factors are displayed in dBASE browse mode. The display shows the annual escalation rates for editing. Four types of price escalators are used in the model:

- Egyptian economy (LE_CUM in database),
- military pay (PAY_CUM in the database),
- FMS prices (FMS_CUM in the database), and
- foreign currency (HC_CUM in the database).

Every time you leave the browse mode, a procedure converts the annual escalation rates into cumulative rates relative to a base year. For the initial implementation of the cost model, FY 1991 prices were used as the base year. After making changes in the annual escalation rates, the maintenance program asks for a base year so that a set of cumulative

rates can be built. The response to this question should be 91, unless all other cost factors and prices have been changed to another base year.[1]

Whenever the escalation assumptions are changed for FMS funding, the portion of the maintenance module that provides access to the costs of implemented cases (see the next subsection), should be run so that properly deflated data are in the constant-dollar version of the FMS database.

B. COSTS OF IMPLEMENTED FMS CASES

The maintenance module provides direct access to the database containing the costs (payment schedules) of FMS cases that are already signed. The data displayed are from the FMI_TY database and are in actual future costs, *not* constant dollars. After you exit the browse mode, the maintenance program automatically runs a procedure to convert the future-year prices to constant dollars using the data in the ESCALATE database. The constant-dollar database containing the payment schedules of already signed FMS cases is called FMI_BASE.

C. PAYMENT PROFILES OF MODERNIZATION PROGRAMS

All purchases made with FMS credits are subject to having the actual payment of the total cost spread over several years. The EXP_PROF (expenditure profiles) database contains a list of payment profiles and the year-by-year fractions of the total amount due for procurements of that type. Each profile contains four entries that represent the decimal fraction of the total cost due each year. The entry in the field labeled YR_0 represents the percentage of the total due in the year of delivery, YR_1 represents the fraction due one year before delivery, and so on. The sum of all four entries must equal one (to ensure that no over- or under-payment occurs). If you make entries that do not sum to one, a warning is displayed when you trying to exit, and the browse window is automatically re-opened.

An information screen is displayed by the maintenance routine prior to providing access to the progress payment profiles database. This screen explains the meaning of each of the fields displayed during the payment profile edit mode. Each record in the database has a short name that is used to link each profile to the entries in the other databases that refer to FMS costs. These names are restored to their original contents, even if you type in

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[1] Changes would be required to all unit and equipment cost factors, to WRM costs per day of supply, and to FMS unit procurement costs to maintain continuity throughout all reference tables. All existing alternatives would then require rebuilding. Existing cost alternatives should not be used under any circumstances if the base year is changed from FY 1991.

a new name. The spelling of these names is essential to the proper operation of the cost model: *do not change them for any reason.*

It is possible to add new payment profiles to this table through this module. Go to the last record, press the DOWN ARROW key, answer "Yes" when asked to append new data. The profile you enter for any new type must also total one or you will not be allowed to exit the edit mode.

D. SALARIES AND INDIRECT PERSONNEL COSTS

The maintenance module provides a means to revise the factors for military salaries and indirect personnel support costs. Military pay rates are input as FY 1991 prices in Egyptian pounds per year. Separate factors are used for officers, NCOs, and conscripts in each service. Indirect personnel support costs are input on an MoD-wide basis, but separate factors exist for officers, NCOs, and conscripts. All of these factors have an Egyptian pound (LE) component and some have a hard currency (HC) component.

E. COST FACTORS FOR UNITS AND EQUIPMENT IN PEACETIME

Through the maintenance module it is also possible to modify the fuel, spare parts, training munitions, fixed operating support (FOS), manning factors, and peacetime optempo for any unit or equipment type. Master characteristics tables are used to transfer these factors into all new alternatives that are built from effectiveness databases. In this module, data on manning and optempo are entered per unit or per item of equipment. Data on fuel, spare parts, and training munitions are entered in terms of the total requirement for a year's operations. The maintenance module then scales the totals so that they represent the cost per unit of optempo and enters them in the characteristics table.

This portion of the maintenance module provides the best means to revise unit manning, optempo, and cost factors for future alternatives in a manner that maintains the required internal consistency. We strongly advise that any modification of the cost factors be made through this process.

The first screen that appears upon access to the cost factor maintenance procedure looks like Figure V-2.

This screen displays manning factors for officers, NCOs, and conscripts in the upper left portion of the screen. Cost factors for fuel, spare parts, training munitions, and fixed operating support are shown on the right of the screen. The bottom portion of the screen is a menu used to identify the type of factor to edit, to choose between unit or

equipment data, to pick a service to work on; and to move forward and backward through the data. The following instructions will get you started. After you become familiar with the selections, efficient ways of choosing will become apparent.

- select a Service by typing a number between 1 and 4,
- select **U** to work on a unit's factors or **E** to edit an equipment factor,
- select **?** to pick an entry by its name, or
- select **P** to work on the previous entry or **N** to move to the next entry (the PREV-> and NEXT-> lines show the names of the previous and next records in the table)
- select a type of factor to edit (e.g., **O, F, T, M, S, A**)

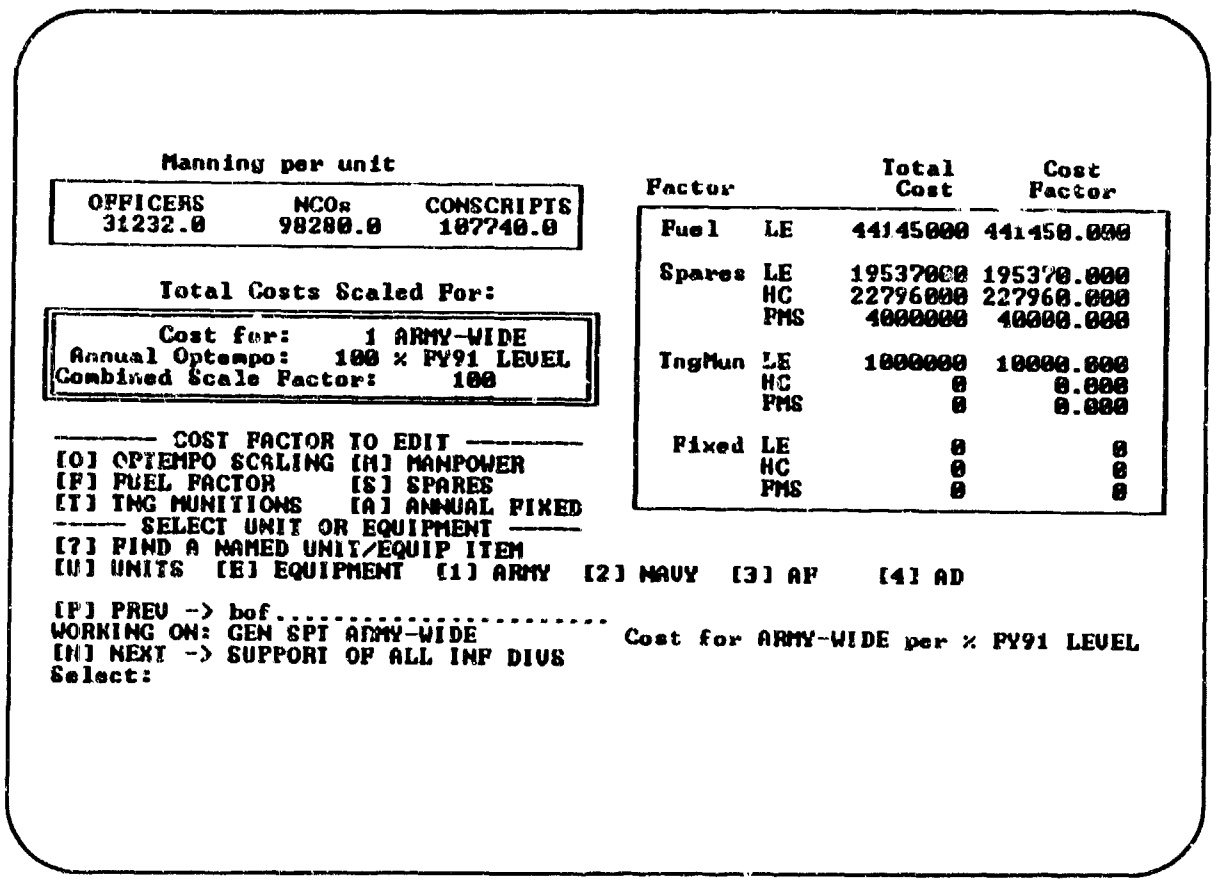

Figure V-2. Edit Screen for Unit and Equipment Operating Cost Factors

The data entry and editing process under model maintenance is set up to have you provide information on total costs and the annual optempo. These data are used to calculate cost factors. When you enter cost data using this process you enter total costs for a full year for any number of units or equipment items. To scale these data correctly so that the

costs may be calculated for each unit or item per unit of optempo, data are required for all three components of the calculation.

Near the left of the screen is a data-entry box labeled `Total Costs Scaled For`. There are two types of entries in this box and another line that shows the total scaling factor calculated from the two entries. One entry provides a place to enter the total annual optempo for the unit or equipment type and a short label describing the unit of measure for that optempo measure. The second entry allows you to provide cost factor data for multiple units without having to do any arithmetic. For example, if you have data on the total training munitions used for 450 tanks, you may record that the data you are entering is for 450 tanks.

The model maintenance process uses the optempo, item quantity, and total cost data to calculate the actual cost factor per tank.[2] The third line in this box shows the total scaling factor that comes from multiplying the annual optempo and the number of units reflected in the data. This scaling factor is used to ensure that the cost factors for fuel, spare parts, and training munitions are related to optempo.

An example of using the maintenance module for fuel illustrates how this capability works (Figure V-2). If you have data showing 24,000 LE were spent on fuel for 30 F-16C/D aircraft and those aircraft flew a total of 6,000 flying hours, you would enter these data as follows:

- use the menu options to cause the F-16C/D equipment entry to show in the `Working on:` line in the menu box,
- select menu option **O** (`Optempo Scaling`),
- enter **6000** and press RETURN (the Annual Optempo amount),
- enter **FHRS PER YR** and press RETURN (the Annual Optempo measure),
- enter **30** and press RETURN (the quantity represented by that cost),
- enter **AIRCRAFT** and press RETURN (the measure of the cost),
- select menu option **F** (Fuel Factor), and
- enter **24000** and press RETURN (the Total Cost of fuel for 30 aircraft flying 6,000 hours).

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[2] Fuel, spare parts, and training munitions are scaled by the product of optempo and item quantity. Fixed operating support is scaled only by item quantity.

After any factor is changed, the maintenance procedure calculates and displays the new total scaling factor and the fuel cost factor. The fuel factor is now expressed in terms of costs per aircraft per flying hour.

F. COST FACTORS FOR WAR RESERVE MATERIALS

The cost model calculates the costs associated with maintaining reserves of war reserve material (see Section II.C.). The methodology used to make these calculations uses cost factors for fuel, spare parts, and munitions required per day of wartime operations. A complete set of factors exists for each type of unit and equipment. The factors are transferred from a general use baseline into new alternatives when the feature for building an alternative is used (see Section IV.D.). The Model Maintenance module provides a convenient way to enter and revise these factors. Figure V-3 shows the edit screen for the module.

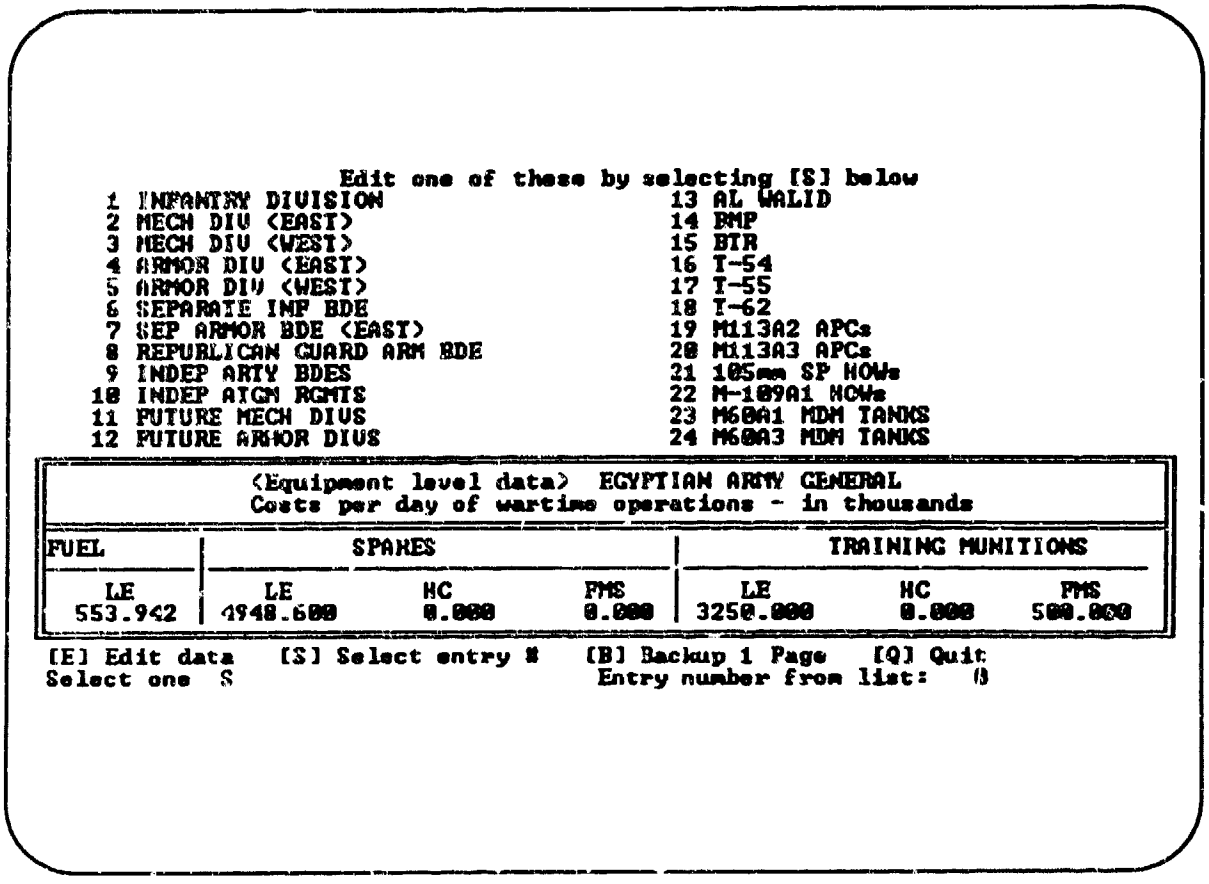


Figure V-3. Edit Screen for War Reserve Material Cost Factors

The top portion of the screen displays a two-column list of units and equipment types. Since the number of units and equipment types is larger than can be displayed at one

time, 24 items are listed at a time. When you press **S** to select a unit or equipment item, you enter the number displayed to the left of the item you want to edit. That item's name is transferred to the active item display in the middle of the screen and the list at the top of the screen is revised so that the item you selected is listed first, followed by the next 23 items on the list. The list is organized as follows:

- Army units by type
- Army equipment types
- Air Defense as a total service
- Air Defense equipment types
- Air Force units by type of brigade
- Air Force equipment types
- Navy units by type of brigade
- Navy equipment types

After you select the specific unit or equipment type, you may edit the cost factors by pressing **E**. Cost factors represent the cost per day of wartime operations and are in thousands of pounds or dollars.

VI. DATABASES

This section provides information on the types of databases within the cost model. An understanding of the databases will be useful to those who maintain the model but is not necessary to use the model. Appendix A provides a structural description of the databases described here. When reading this section, it is helpful to have a basic understanding of the processes used to build a cost alternative from an effectiveness database. Sections II and IV provide the necessary background.

The cost model and all of the data files were developed in a dBASE III+ format. The cost model consists of three major sets of database files. The first set records all of the details describing an alternative. Each alternative has a complete set of these files. The second is the baseline file set. These files contain the database structures and some of the initial values needed to build each new alternative. The third set contains data tables used during model calculations and cannot be changed from one alternative to another.

Database sets describing specific alternatives reside in the COSTMDL subdirectory. The other two sets of data reside in the BASELINE subdirectory. This section of the manual first describes the naming conventions used with the alternative database files. Next, each of the ten basic types of databases required to define an alternative are described. The concluding portion of this section describes the baseline reference tables that are used by the model but not contained in each alternative data set.

A. DATABASE NAMING CONVENTIONS

Each alternative requires ten separate databases to record and track changes in its force structure, manning, optempo, cost factors, WRM objectives, special projects, and FMS modernization program. These databases use the same general naming convention. Each database's name identifies the type of information contained in the file and the name of the alternative it describes. All cost model databases use the standard dBASE file extension "dbf".

Each database name is in two parts, each part separated by the underline character (_). The first three characters indicate the file type while the last four characters indicate the associated alternative. All baseline files have "BASE" as the last four characters in their names. Table VI-1 lists the ten basic types of databases and summarizes their contents.

Table VI-1. Database Naming Conventions

Database Stem	Database Contents
FOR_	Force structure and quantities of equipment
MPW_	Manning for each unit and item of equipment
OPS_	Operating rates for each unit and item of equipment
SPR_	Spares cost factors
FAC_	Fuel, training munitions, and technical support cost factors
RTS_	Personnel-based cost factors
CST_	Cost calculation results
FMP_	Planned FMS system procurements
PRJ_	Other project costs
WRM_	War-fighting sustainability (WRM) objectives

B. DATABASES REQUIRED TO DESCRIBE EACH ALTERNATIVE

1. Forces and Equipment (FOR_????.dbf)[1]

The FOR_???? database contains data on the number of major units and the quantities of various equipment types assigned to them. The database is organized by service; within each service by major and subordinate unit type; and within each unit type by equipment type. For a more in-depth explanation of this hierarchical structure, see Section III, Data Structure. The primary purpose of the database is to represent the organization of the services in terms of numbers of units and quantities of equipment. The sequential list of units and equipment is used to create the record structure of the manpower (MPW_???), optempo (OPS_????), spare parts (SPR_????), and cost factors (FAC_????) databases. These databases require the same structure to ensure that all cost factors correspond exactly to the same entry.

Each FOR_???? database contains two key fields that link it with other databases in the alternative set and in the baseline reference tables. Every record contains a unit-type identifier (UNITTYPE) and an equipment-type identifier (EQPCD). All unit and equipment records must have a UNITTYPE. Records that describe units have a blank EQPCD field. Every record is uniquely identified by the UNITTYPE + EQPCD combination. These fields are the key links to the units and equipment characteristics data table used to build each new alternative. If a record has

1 The ???? indicates that any combination of letters and numbers can appear in these locations. The ???? is the name of the alternative and can be one to four characters in length.

a UNITTYPE or EQPCD that is not in the CHR_BAS? databases, no manpower, optempo, or cost data can be transferred in the build process to populate the databases.

Each record also has a UNITID field that controls the sequence in which the data are organized in the FOR_???? and related databases. Sometimes data records are added to an effectiveness database out of normal sequence. As long as the UNITID field has a value that matches its correct place in the sequence of units, the build process in the cost model will correctly place the out-of-sequence entry.

The cost model uses the names in the UNITNM and EQPNM fields of the effectiveness databases to prepare the titles that describe the units and equipment in the cost model. If the condensed option is chosen while building a new alternative, the cost model will combine all like units within each major unit type and remove the numeric identifier of the units. For example, the 1st Armor BDE and 2nd Armor BDE will be combined into a single record, Armor BDEs with quantity two. If the condensed mode is not chosen, the full unit name is transferred.

2. Manpower (MPW_????.dbf)

The manpower database contain information on officer, NCO, and conscript manpower. The record-by-record structure of the MPW_???? database corresponds directly to the structure of the FOR_???? forces and equipment database for the same alternative. For example, record 200 in both databases must be for the same combination of UNITID, UNITTYPE, and EQPCD. Each record contains fields with manning factors by year and fields with total manning. Totals are calculated by multiplying the corresponding annual unit or equipment quantity in the FOR_???? database by the manpower factor for each year. The calculation of total manning occurs each time the `Calculate Peacetime Operating Costs` option is chosen from the cost model's Main Menu.

The manning factor entered in any equipment record represents the number of personnel required per unit of equipment. For example, if there are 1.3 pilots and 2 maintenance officers for every MiG-21, the manning factor entered in the characteristics table and subsequently transferred to the MPW_???? database should be 3.3 officers for the MiG-21 record. When each MPW_???? database is built, this initial value is placed in each year.

The manning factor in non-equipment records (e.g., MiG-21 brigades) represents all manpower in that unit that does not vary as the amount of equipment changes. If there are 150 officers in a MiG-21 brigade that has 30 aircraft and the equipment manning factor is 3.3 per aircraft, then 51 officers (150 - (30 x 3.3)) are shown on the MiG-21 brigade's record.

When a new alternative is built, the manning factors are obtained from the baseline characteristics database (see the discussion later in this section). As in the case of the forces databases, the UNITTYPE and EQPCD fields are the data keys that link the manpower database with the unit and equipment characteristics data table. After the alternative is created, the manning factors may be changed in any alternative without affecting other alternatives or the BASELINE manpower database.

3. Peacetime Optempo (OPS_????.dbf)

This database contains data on unit and equipment optempos for an alternative. Just as for the MPW_???? database, the record-by-record structure of the optempo database corresponds directly to the structure of the forces and equipment database. Each record in the two databases must have the same UNITTYPE and EQPCD combination. Each record contains fields with optempo factors by year and fields with total optempos for all of the quantities of units and equipment in the forces database. The optempo database also records the measure of the optempo factor, whether it is flying hours per aircraft (FHRS/AC), steaming days per ship (STMG DAYS/SHIP), or field training hours (FLD TNG HRS). Totals are calculated by multiplying the corresponding annual unit or equipment quantity in the FOR_???? database by the optempo factor year by year. The calculation of total optempo occurs each time the `Calculate Peacetime Operating Costs` option is chosen from the cost model's Main Menu. Optempo factors and unit and equipment quantities may be changed manually at any time through the model, but only the cost model calculates the total optempo for each unit and equipment type.

When a new alternative is created, optempo factors, and their associated optempo measures, are obtained from the baseline characteristics database. As in the case of the forces databases, the UNITTYPE and EQPCD fields are the data keys that link the optempo database with the unit and equipment characteristics data table. After the alternative has been created, the optempo factors may be changed without affecting other alternatives.

4. Spare Parts and Supplies (SPR_????.dbf)

This database contains cost factors for spare and repair parts costs per unit of optempo per unit for all types of units and equipment that appear in the forces database of an alternative. There is a spares record that corresponds directly to every record in the forces and equipment database. Each record contains fields with spares cost factors by year for each of the three potential funding sources (e.g., LE90 is the cost of spares bought with local currency in 1990, HC90 is the cost of spares bought with hard currency in 1990, FMS90 is the cost of spares bought via FMS funding in

1990). Each equipment type may have any combination of funding sources for spares in each of the years being estimated.

When a new alternative is built, the spare parts cost factors are obtained from the baseline characteristics database. As in the case of the forces databases, the UNITTYPE and EQPCD fields are the data keys that link the spares database with the unit and equipment characteristics data table. After the alternative is created, the cost factors may be changed without affecting other alternatives. They may also be changed independently each year.

5. Peacetime Operations Non-Spares Cost Factors (FAC_????.dbf)

This database contains cost factors for fuel, training munitions, and technical support per unit of optempo per unit. There is a cost factor record that corresponds directly to every record in the forces and equipment database. Every record contains fields with fuel, munitions, and technical support factors. Unlike the spares factors, these cost factors do not change each year but are held constant throughout the analysis period, so there is only one field per factor. In the case of munitions and technical support, there are factors for each potential funding source (e.g., TNGMUN_LE is the cost of training munitions per unit of optempo bought with local currency, etc.). Each equipment type may have any combination of funding sources for training munitions and technical support. Fuel however is only purchased with Egyptian pounds.

When a new alternative is built, the fuel, training munitions, and fixed operating support cost factors are obtained from the baseline characteristics database. As in the case of the other databases, the UNITTYPE and EQPCD fields are the data keys that link the cost factors database with the unit and equipment characteristics data table. After the alternative is created, the cost factors may be changed without affecting other alternatives.

6. Personnel Cost Factors (RTS_????.dbf)

The personnel cost factors database contains the data used to calculate pay and other costs for an alternative that vary with total service manning. These cost factors are held at a constant value per person throughout the analysis period. The RTS_???? database has separate cost factors for officers, NCOs, and conscripts. Pay factors are further broken out by service. If desired, the factors for each service can be set to the same or different values. The other categories of indirect support costs are simply treated at the MoD level. Separate factors can be entered for officers, NCOs, and conscripts or the three values can be set to the same values. The indirect support factors and the funding types for each are:

- base support (Egyptian pounds and hard currency),
- clothing (Egyptian pounds and hard currency),

- housing (Egyptian pounds and hard currency),
- medical support (Egyptian pounds and hard currency),
- indirect personnel support (Egyptian pounds and hard currency), and
- rations (Egyptian pounds).

These data are initially derived by copying the RTS_BASE database into the new alternative. All pay and indirect support factors may be changed in one alternative without effecting other alternatives.

7. Peacetime Operating Cost Calculation Results (CST_????.dbf)

This database records the results obtained when the `Calculate Peacetime Operating Costs` option is chosen from the cost model's Main Menu. Each time the costs are calculated, the existing contents of the CST_???? database are deleted and replaced with the new results. The database is used to generate many of the reports available from the Reports Menu. Data are recorded in the CST_???? database at the following levels of detail:

- fuel,
- training munitions,
- fixed operating support,
- pay by service and personnel type,
- indirect personnel support by personnel type,
- spares.

8. FMS Modernization Program (FMP_????.dbf)

Each alternative has a database that lists many potential FMS modernization programs. This database contains the unit cost, the FMS payment profile, quantities to be procured, and other pertinent descriptive data. When a new alternative is built, the baseline version, called FMP_BASE in the BASELINE subdirectory, is copied to the new alternative's FMP_???? file. All values can be changed within this new alternative without affecting any other FMS modernization file or the BASELINE version.

One field of particular importance is the include (INCL) field. This is used to mark all FMS projects to be included in any given alternative. When reports are created that report FMS costs, they use the amounts in the funding fields of entries that have been marked as included programs. As you edit the data in each alternative's FMP_???? database, the model calculates and

stores the annual funding requirements for each project. These requirements are all stored in constant dollars.

You may modify the FMP_BASE file through the model maintenance procedure described in Section V.

9. Special Projects (PRJ_????.dbf)

The PRJ_???? database provides a means to record costs for projects that cannot be considered part of peacetime operations, WRM requirements, or FMS modernization programs. The PRJ_???? database can be used to record projects such as facilities construction or local procurement. The database allows recording of project costs in any combination of LE, hard currency, and FMS dollars. When an alternative is first created, there are no projects in the database.

10. War Reserve Material Program (WRM_????.dbf)

The WRM_???? database contains entries for each unit type and each major equipment type. This database contains all of the data required to calculate funding requirements for all three types of WRM resources in all three types of currencies. The database contains the total quantity of each type of unit and major equipment item in each year, the days-of-supply objective for each year, the cost per day of wartime operations, and the funding requirements that result for each year.

When a new alternative is built, the WRM_BASE database is copied into the new alternative's data set. The building process then uses the forces database for the alternative to determine the quantities of unit types and equipment in that alternative. These quantities are then transferred to the WRM_???? database and replace the values that were in the WRM_BASE version. The days of supply and cost factors remain the same as in WRM_BASE.

C. BASELINE REFERENCE TABLES

In addition to the information needed to describe each alternative, there are other types of data required to build new alternatives, to cost the different components of the total program, and to prepare reports. The five types of data tables containing this information reside in the BASELINE subdirectory.

1. Escalation and Price Growth Table

The cost model uses a database called ESCALATE to record escalation indices. The ESCALATE database is used to convert constant price calculations to then-year prices for screen

displays and reports. It is also used in the special projects and FMS projects modules to convert then-year dollar entries into constant dollars. This database contains annual price change data as well as factors that contain the cumulative price changes relative to the base year. Section V describes the recommended procedures for updating this database. Appendix C contains a table with the rates used.

2. FMS Payment Profiles

Typically the total cost of an FMS system procurement is not paid solely in the year the system is delivered. The EXP_PROF table contains a list of all defined payment profile names and their year-by-year payment percentages. These data are used to estimate the annual payment schedule associated with FMS modernization programs and portions of the WRM program.

3. Fixed Costs

The cost model records most fixed costs in a single database table. This database is named MOD_FIXD. The data in the table are from the FY 1991 MoD budget for activities that do not vary with changes in MoD manpower, forces, or equipment inventories. The 1991 data have been copied into years 1992 through 1998.

4. Costs of Previously Signed Cases

A major portion of future FMS requirements is payments for FMS cases that have already been signed. The cost model keeps these data in two databases called FMI_BASE and FMI_TY. Cost data in the FMI_BASE table are in constant FY 1991 prices and is derived from the table called FMI_TY, which is in then-year dollars. Section V describes how these should be revised and maintained as costs for individual cases change or new cases are signed. As long as all changes are made using the model maintenance process, the changes will be made in the then-year dollar file and converted to constant dollars in the FMI_BASE table.

5. Unit and Equipment Characteristics

The model maintains manning, optempo, and cost factors for each type of unit and equipment in master reference tables. There are three of these files identified by a "CHR_" prefix; CHR_BAS0, CHR_BAS1, and CHR_BASE. These files form the heart of the process that builds each new alternative from the force effectiveness data. Factors in these databases are transferred to the appropriate cost alternative databases when new alternatives are built. After the characteristics are transferred, any values in the new alternative may be changed without affecting other

alternatives and without impacting the building of new alternatives. Any changes in these three files will affect all future alternatives.

CHR_BAS0 and CHR_BAS1 are permanent files that contain the information that allows the user to build an alternative using either the FY91 manning levels and operating rates or enhanced levels and rates. Depending on which choice is made while building an alternative, one of the two files is copied to CHR_BASE and this file is used to build the new alternative.

Any revisions to these factors should be done through the model maintenance procedures described in Section V.

APPENDIX A

STRUCTURES FOR COST MODEL DATABASES

Structure for database: FOR_????.DBF

Field	Field Name	Type	Width	Dec
1	SPARE	Character	20	
2	OPS_MEAS	Character	12	
3	UNITID	Character	8	
4	UNITTYPE	Character	6	
5	EQPCD	Character	6	
6	EQPTYPE	Character	5	
7	TITLE	Character	26	
8	F91	Numeric	4	
9	F92	Numeric	4	
10	F93	Numeric	4	
11	F94	Numeric	4	
12	F95	Numeric	4	
13	F96	Numeric	4	
14	F97	Numeric	4	
15	F98	Numeric	4	
** Total **			116	

Structure for database: MFW_????.DBF

Field	Field Name	Type	Width	Dec
1	SPARE	Character	14	
2	UNITID	Character	8	
3	UNITTYPE	Character	6	
4	EQPCD	Character	6	
5	TITLE	Character	26	
6	OFF91	Numeric	7	1
7	OFF92	Numeric	7	1
8	OFF93	Numeric	7	1
9	OFF94	Numeric	7	1
10	OFF95	Numeric	7	1
11	OFF96	Numeric	7	1
12	OFF97	Numeric	7	1
13	OFF98	Numeric	7	1
14	NCO91	Numeric	7	1
15	NCO92	Numeric	7	1
16	NCO93	Numeric	7	1
17	NCO94	Numeric	7	1
18	NCO95	Numeric	7	1
19	NCO96	Numeric	7	1
20	NCO97	Numeric	7	1
21	NCO98	Numeric	7	1
22	CON91	Numeric	8	1
23	CON92	Numeric	8	1
24	CON93	Numeric	8	1
25	CON94	Numeric	8	1
26	CON95	Numeric	8	1
27	CON96	Numeric	8	1
28	CON97	Numeric	8	1
29	CON98	Numeric	8	1
30	TOF91	Numeric	9	
31	TOF92	Numeric	9	
32	TOF93	Numeric	9	
33	TOF94	Numeric	9	
34	TOF95	Numeric	9	
35	TOF96	Numeric	9	
36	TOF97	Numeric	9	
37	TOF98	Numeric	9	
38	TNC91	Numeric	9	
39	TNC92	Numeric	9	
40	TNC93	Numeric	9	
41	TNC94	Numeric	9	
42	TNC95	Numeric	9	
43	TNC96	Numeric	9	
44	TNC97	Numeric	9	
45	TNC98	Numeric	9	
46	TCN91	Numeric	9	
47	TCN92	Numeric	9	
48	TCN93	Numeric	9	
49	TCN94	Numeric	9	

Structure for database: MPW_????.DBF (CONTINUED)

Field	Field Name	Type	Width	Dec
50	TCN95	Numeric	9	
51	TCN96	Numeric	9	
52	TCN97	Numeric	9	
53	TCN98	Numeric	9	
54	MRK	Numeric	10	
** Total **			463	

Structure for database: OPS_????.DBF

Field	Field Name	Type	Width	Dec
1	SPARE	Character	14	
2	UNITID	Character	8	
3	UNITTYPE	Character	6	
4	EQPCD	Character	6	
5	TITLE	Character	26	
6	OPS_MEAS	Character	12	
7	F91	Numeric	6	1
8	F92	Numeric	6	1
9	F93	Numeric	6	1
10	F94	Numeric	6	1
11	F95	Numeric	6	1
12	F96	Numeric	6	1
13	F97	Numeric	6	1
14	F98	Numeric	6	1
15	T91	Numeric	9	1
16	T92	Numeric	9	1
17	T93	Numeric	9	1
18	T94	Numeric	9	1
19	T95	Numeric	9	1
20	T96	Numeric	9	1
21	T97	Numeric	9	1
22	T98	Numeric	9	1
23	MRK	Numeric	10	
** Total **			203	

Structure for database: FAC_????.DBF

Field	Field Name	Type	Width	Dec
1	SPARE	Character	14	
2	UNITID	Character	8	
3	UNITTYPE	Character	6	
4	EQPCD	Character	6	
5	TITLE	Character	26	
6	OPS_MEAS	Character	12	
7	FUEL_LE	Numeric	8	1
8	TNGMUN_LE	Numeric	8	1
9	TNGMUN_HC	Numeric	8	1
10	TNGMUN_FMS	Numeric	8	1
11	TM_ORG_ID	Character	6	
12	TM_FMS_ID	Character	6	
13	FOS_LE	Numeric	6	
14	FOS_HC	Numeric	6	
15	FOS_FMS	Numeric	6	
16	FOS_ORG_ID	Character	6	
17	FOS_FMS_ID	Character	6	
** Total **			147	

Structure for database: SPR_????.DBF

Field	Field Name	Type	Width	Dec
1	ORG_ID	Character	6	
2	FMS_ID	Character	6	
3	SPARE	Character	14	
4	UNITID	Character	8	
5	UNITTYPE	Character	6	
6	EQPCD	Character	6	
7	TITLE	Character	26	
8	OPS_MEAS	Character	12	
9	LE91	Numeric	8	1
10	HC91	Numeric	8	1
11	FMS91	Numeric	8	1
12	LE92	Numeric	8	1
13	HC92	Numeric	8	1
14	FMS92	Numeric	8	1
15	LE93	Numeric	8	1
16	HC93	Numeric	8	1
17	FMS93	Numeric	8	1
18	LE94	Numeric	8	1
19	HC94	Numeric	8	1
20	FMS94	Numeric	8	1
21	LE95	Numeric	8	1
22	HC95	Numeric	8	1
23	FMS95	Numeric	8	1
24	LE96	Numeric	8	1
25	HC96	Numeric	8	1
26	FMS96	Numeric	8	1
27	LE97	Numeric	8	1
28	HC97	Numeric	8	1
29	FMS97	Numeric	8	1
30	LE98	Numeric	8	1
31	HC98	Numeric	8	1
32	FMS98	Numeric	8	1
** Total **			277	

Structure for database: CST_????.DBF

Field	Field Name	Type	Width	Dec
1	FMS_ID	Character	6	
2	ORG_ID	Character	6	
3	UNITID	Character	8	
4	TITLE	Character	26	
5	EQPCD	Character	6	
6	FUND	Character	3	
7	CSTTYPE	Character	6	
8	F91	Numeric	8	
9	F92	Numeric	8	
10	F93	Numeric	8	
11	F94	Numeric	8	
12	F95	Numeric	8	
13	F96	Numeric	8	
14	F97	Numeric	8	
15	F98	Numeric	8	
** Total **			126	

Structure for database: RTS_????.DBF

Field	Field Name	Type	Width	Dec
1	FAC_NAME	Character	8	
2	FUND_MSTR	Character	3	
3	TITLE	Character	8	
4	ORG_ID	Character	6	
5	FUND	Character	3	
6	OFF_VAL	Numeric	10	3
7	NCO_VAL	Numeric	10	3
8	CON_VAL	Numeric	10	3
** Total **			59	

Structure for database: WRM_????.DBF

Field	Field Name	Type	Width	Dec
1	WRM_TYPE	Character	1	
2	EXP_TYPE	Character	5	
3	EQPCD	Character	6	
4	UNITTYPE	Character	6	
5	TITLE	Character	26	
6	ORG_ID	Character	6	
7	FMS_ID	Character	6	
8	FUND	Character	3	
9	CST_PER_D	Numeric	10	3
10	U_91	Numeric	6	1
11	U_92	Numeric	6	1
12	U_93	Numeric	6	1
13	U_94	Numeric	6	1
14	U_95	Numeric	6	1
15	U_96	Numeric	6	1
16	U_97	Numeric	6	1
17	U_98	Numeric	6	1
18	DOS91	Numeric	5	1
19	DOS92	Numeric	5	1
20	DOS93	Numeric	5	1
21	DOS94	Numeric	5	1
22	DOS95	Numeric	5	1
23	DOS96	Numeric	5	1
24	DOS97	Numeric	5	1
25	DOS98	Numeric	5	1
26	F91	Numeric	8	
27	F92	Numeric	8	
28	F93	Numeric	8	
29	F94	Numeric	8	
30	F95	Numeric	8	
31	F96	Numeric	8	
32	F97	Numeric	8	
33	F98	Numeric	8	
** Total **			222	

Structure for database: FMP_????.DBF

Field	Field Name	Type	Width	Dec
1	CHANGE	Logical	1	
2	REMOVE	Logical	1	
3	INCL	Logical	1	
4	ORDER	Character	8	
5	CSTTYPE	Character	6	
6	FMS_ID	Character	6	
7	FMS_PRG	Character	37	
8	FMS_AREA	Character	37	
9	TITLE	Character	26	
10	UC_BASE	Numeric	6	
11	UNIT_COST	Numeric	6	
12	EXP_TYPE	Character	5	
13	TOTAL_QTY	Numeric	5	
14	DEL91	Numeric	5	
15	DEL92	Numeric	5	
16	DEL93	Numeric	5	
17	DEL94	Numeric	5	
18	DEL95	Numeric	5	
19	DEL96	Numeric	5	
20	DEL97	Numeric	5	
21	DEL98	Numeric	5	
22	DEL99	Numeric	5	
23	DEL00	Numeric	5	
24	F79_91	Numeric	8	
25	F91	Numeric	8	
26	F92	Numeric	8	
27	F93	Numeric	8	
28	F94	Numeric	8	
29	F95	Numeric	8	
30	F96	Numeric	8	
31	F97	Numeric	8	
32	F98	Numeric	8	
33	F99	Numeric	8	
34	F00	Numeric	8	
** Total **			284	

Structure for database: PRJ_????.DBF

Field	Field Name	Type	Width	Dec
1	SVC	Character	1	
2	CHANGE	Logical	1	
3	REMOVE	Logical	1	
4	ORG_ID	Character	6	
5	ORG_AUTH	Character	26	
6	ORG_DEPT	Character	26	
7	FMS_ID	Character	6	
8	FMS_PRG	Character	37	
9	FMS_AREA	Character	37	
10	TITLE	Character	26	
11	FUND	Character	3	
12	CSTTYPE	Character	6	
13	F91	Numeric	5	
14	F92	Numeric	5	
15	F93	Numeric	5	
16	F94	Numeric	5	
17	F95	Numeric	5	
18	F96	Numeric	5	
19	F97	Numeric	5	
20	F98	Numeric	5	
** Total **			217	

Structure for database: CHR_BASE.DBF

Field	Field Name	Type	Width	Dec
1	COMMENT	Character	38	
2	UNITID	Character	8	
3	UNITTYPE	Character	8	
4	UNITNM	Character	26	
5	EQPCD	Character	6	
6	EQPNM	Character	26	
7	OFFICERS	Numeric	7	1
8	NCOS	Numeric	7	1
9	CONSCRIPTS	Numeric	8	1
10	OPTEMPO	Numeric	6	
11	OPS_MEAS	Character	12	
12	ITEM_QTY	Numeric	4	
13	QTY_MEAS	Character	12	
14	SCALE	Numeric	8	
15	TOT_FUEL	Numeric	10	
16	FUEL_LE	Numeric	10	3
17	TOT_SP_LE	Numeric	10	
18	SPARES_LE	Numeric	10	3
19	TOT_SP_HC	Numeric	10	
20	SPARES_HC	Numeric	10	3
21	TOT_SP_FMS	Numeric	10	
22	SPARES_FMS	Numeric	10	3
23	TOT_TM_LE	Numeric	10	
24	TNGMUN_LE	Numeric	10	3
25	TOT_TM_HC	Numeric	10	
26	TNGMUN_HC	Numeric	10	3
27	TOT_TM_FMS	Numeric	10	
28	TNGMUN_FMS	Numeric	10	3
29	TOT_FOS_LE	Numeric	10	
30	FOS_LE	Numeric	10	
31	TOT_FOS_HC	Numeric	10	
32	FOS_HC	Numeric	10	
33	TOT_FOS_FM	Numeric	10	
34	FOS_FMS	Numeric	10	
35	SPARE	Character	6	
** Total **			383	

Structure for database: MOD_FIXD.DBF

Field	Field Name	Type	Width	Dec
1	ORG_ID	Character	5	
2	ORG_TITLE	Character	32	
3	COST_CAT	Character	4	
4	LE91	Numeric	7	
5	HC91	Numeric	7	
6	LE92	Numeric	7	
7	HC92	Numeric	7	
8	LE93	Numeric	7	
9	HC93	Numeric	7	
10	LE94	Numeric	7	
11	HC94	Numeric	7	
12	LE95	Numeric	7	
13	HC95	Numeric	7	
14	LE96	Numeric	7	
15	HC96	Numeric	7	
16	LE97	Numeric	7	
17	HC97	Numeric	7	
18	LE98	Numeric	7	
19	HC98	Numeric	7	
** Total **			154	

Structure for database: FMI_BASE.DBF

Field	Field Name	Type	Width	Dec
1	CSTTYPE	Character	6	
2	LVL1	Character	4	
3	LVL2	Character	2	
4	FMS_ID	Character	7	
5	FMS_TITLE	Character	40	
6	F79_91	Numeric	8	
7	F91	Numeric	8	
8	F92	Numeric	8	
9	F93	Numeric	8	
10	F94	Numeric	8	
11	F95	Numeric	8	
12	F96	Numeric	8	
13	F97	Numeric	8	
14	F98	Numeric	8	
** Total **			132	

Structure for database: ESCALATE.DBF

Field	Field Name	Type	Width	Dec
1	TITLE	Character	9	
2	F90	Numeric	6	4
3	ANN91	Numeric	6	4
4	F91	Numeric	6	4
5	ANN92	Numeric	6	4
6	F92	Numeric	6	4
7	ANN93	Numeric	6	4
8	F93	Numeric	6	4
9	ANN94	Numeric	6	4
10	F94	Numeric	6	4
11	ANN95	Numeric	6	4
12	F95	Numeric	6	4
13	ANN96	Numeric	6	4
14	F96	Numeric	6	4
15	ANN97	Numeric	6	4
16	F97	Numeric	6	4
17	ANN98	Numeric	6	4
18	F98	Numeric	6	4
** Total **			112	

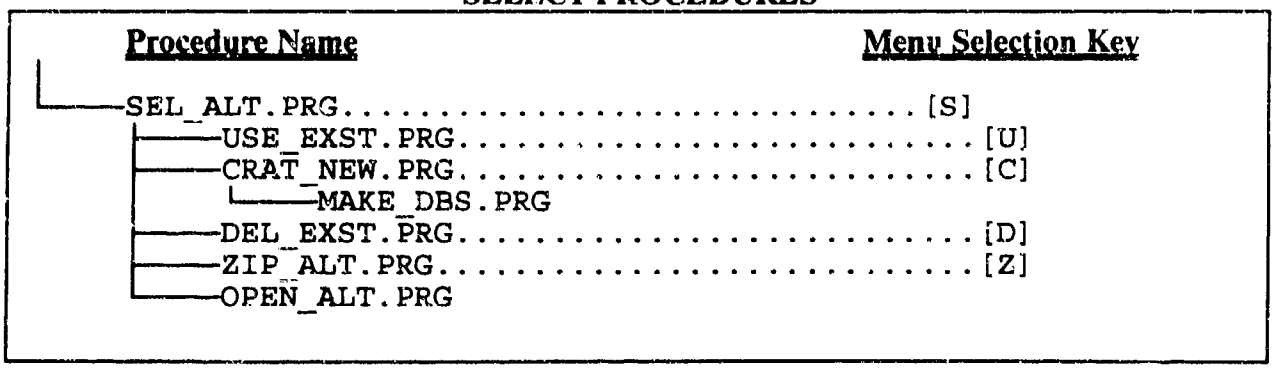
APPENDIX B

COST MODEL PROCEDURE TREES

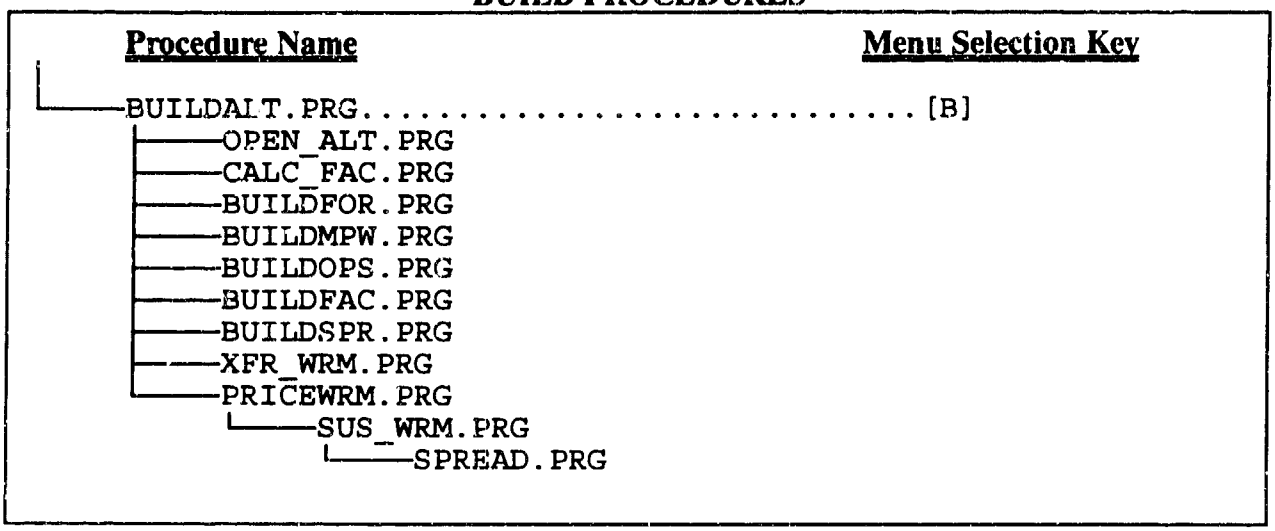
MAIN MENU PROCEDURES

Procedure Name	Menu Selection Key
COSTMDL.PRG	[F10]
——SEL_ALT.PRG	[S]
——BUILDALT.PRG	[B]
——MOD_VIEW.PRG	[U]
——CST_WRM.PRG	[W]
——FMS_CST.PRG	[F]
——PROJECTS.PRG	[P]
——CALC_CST.PRG	[C]
——REPORTS.PRG	[R]
——OPEN_ALT.PRG	Called by various model procedures
——CMSCREEN.PRG	Called on Exit

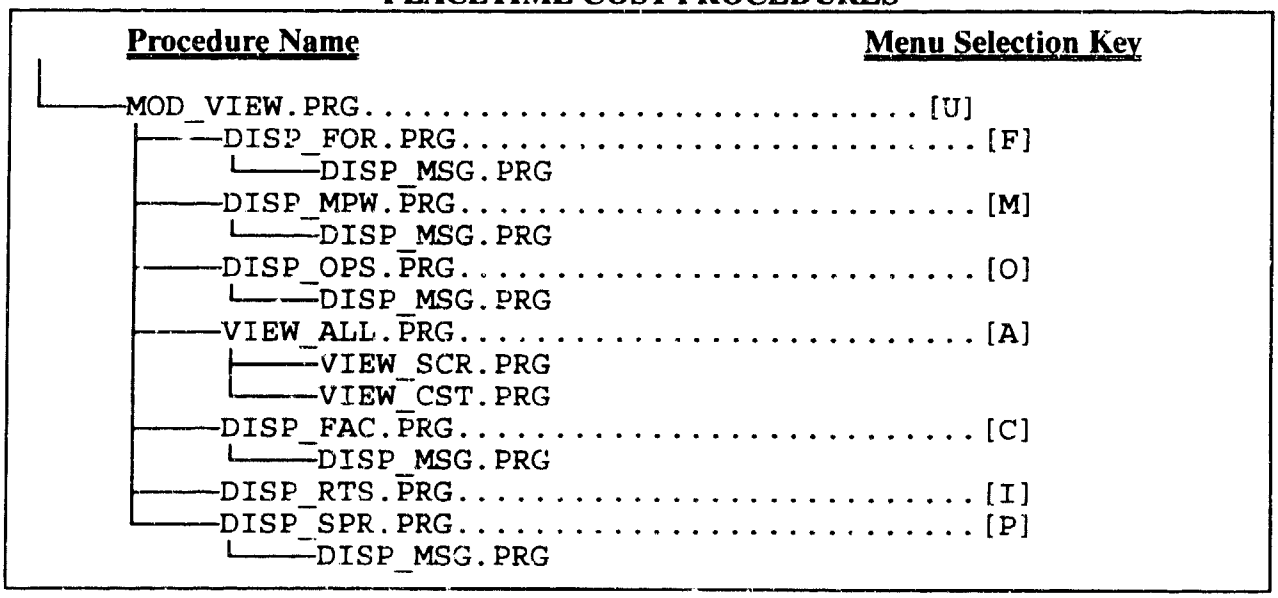
SELECT PROCEDURES



BUILD PROCEDURES



PEACETIME COST PROCEDURES



WAR RESERVE MATERIAL PROCEDURES

Procedure Name	Menu Selection Key
CST_WRM.PRG	[W]
MARK_WRM.PRG	
DISP_WRM.PRG	[C]
SUS_WRM.PRG	
ERAS_WRM.PRG	[D]
PRICEWRM.PRG	[P]
XFR_WRM.PRG	[T]
SUM_WRM.PRG	[V]
OPEN_ALT.PRG	

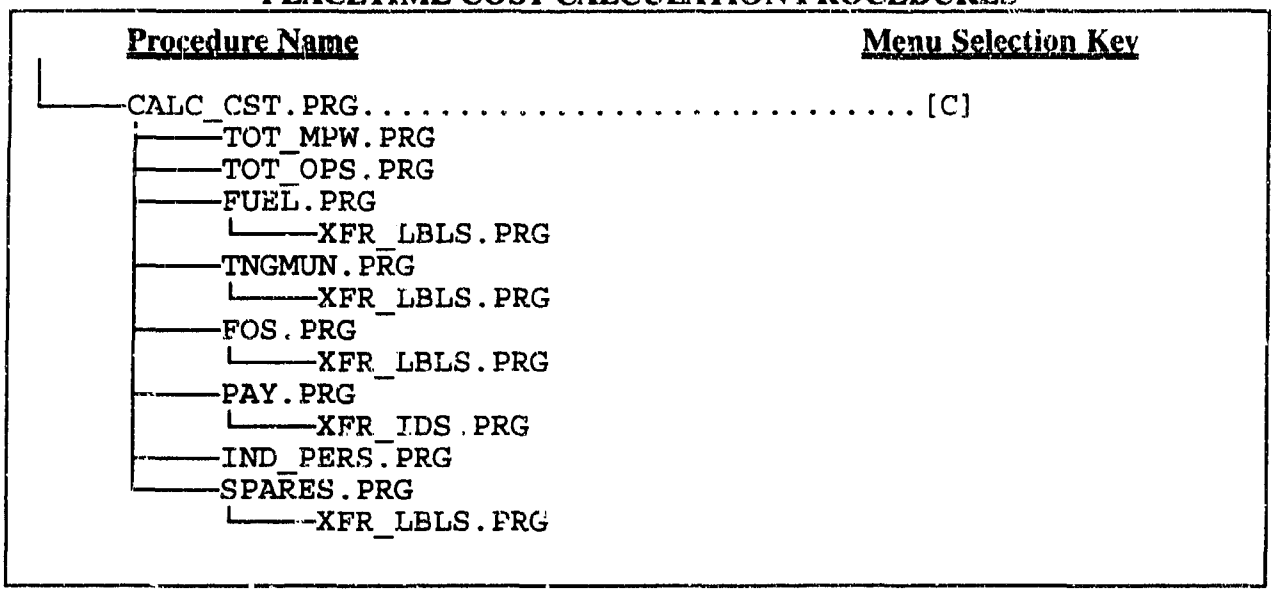
FMS MODERNIZATION PROCEDURES

Procedure Name	Menu Selection Key
FMS_CST.PRG	[F]
CRAT_FMS.PRG	[A]
SEL_F_ID.PRG	
SEL_EXPT.PRG	
CST_FMS.PRG	
SPREAD.PRG	
FMS_PICT.PRG	
OPEN_ALT.PRG	
DELE_FMS.PRG	[D]
EDIT_FMS.PRG	[C]
MARK_FMS.PRG	
SEL_F_ID.PRG	
SEL_EXPT.PRG	
CST_FMS.PRG	
PRICEFMS.PRG	[P]

PROJECT PROCEDURES

Procedure Name	Menu Selection Key
PROJECTS.PRG	[P]
CRAT_PRJ.PRG	[A]
EDIT_PRJ.PRG	[C]
SEL_O_ID.PRG	
SEL_F_ID.PRG	
OPEN_ALT.PRG	
MARK.PRG	
DELE_PRJ.PRG	[D]

PEACETIME COST CALCULATION PROCEDURES



REPORT PROCEDURES

Procedure Name	Menu Selection Key	
REPORTS.PRG	[R]	
OPEN_ALT.PRG		
SEL_ALT.PRG		
RPT_E1.PRG	[E1]	
FOR.FRM (report form)		
RPT_E2_O.PRG	[E2]	OFF=Y
TOFF_MP.FRM (report form)		
RPT_E2_N.PRG	[E2]	NCO=Y
TNCO_MP.FRM (report form)		
RPT_E2_C.PRG	[E2]	CON=Y
TCON_MP.FRM (report form)		
RPT_TMPW.PRG	[E3]	
RPT_ESUM.PRG	[E4]	
RPT_USUM.PRG	[E5]	
RPT_OWRM.PRG	[E6]	
RPT_CST.PRG	[B1]	=>M
SUS_WRM.PRG		
OPEN_ALT.PRG		
RPT_ECST.PRG	[B1]	=>S
OPEN_ALT.PRG		
RPT_FFMS.PRG	[B2]	=>F
RPT_SFMS.PRG	[B2]	=>S
RPT_AFMS.PRG	[B3]	
RPT_SWRM.PRG	[B4]	
RPT_CST2.PRG	[B5]	=>SR
OPEN_ALT.PRG		
RPT_SCST.PRG	[B5]	=>9*
RPT_U1_O.PRG (OFF_MPW.FRM)	[U1]	OFF
RPT_U1_N.PRG (NCO_MPW.FRM)	[U1]	NCO
RPT_U1_C.PRG (CON_MPW.FRM)	[U1]	CON
RPT_U2.PRG (OPS.FRM)	[U2]	
RPT_C1.PRG (FACTOR.FRM)	[C1]	
RPT_SPR.PRG	[C2]	
RPT_C3.PRG	[C3]	
RPT_FWRM.PRG	[C4]	

APPENDIX C

UNIT COSTS OF MODERNIZATION PROGRAMS AND OTHER FACTORS

Table C-1. Army Programs

TITLE	UNIT COST
DRAGON III LNCHRS/MSLS	50
M60A3 UPGRADE OF M60A1	350
M60A1 NEW PROCUREMENT	1,560
M60A3 PROCUREMENT	2,040
M113A2 NEW PROCUREMENT	350
M113A3 UPGRADE FROM M113A2	180
M113A3 NEW PROCUREMENT	460
BRADLEY FTG VEH (M2)	1,400
HELP TANKS (M88A1)	1,080
ARVs FOR NEW UNITS	1,920
TOW II MISSILES	16
122MM SP (80)	1,320
TOW II LAUNCHER	59
105MM HOWITZER,TOWED	260
105MM HOWITZER, SP	480
M109 155MM HOWITZER,SP	1,320
TPQ 37 RADAR	9,560
I-TOW LAUNCHER	59
I-TOW MISSILES	17
PRC 77 RADIO	2
NIGHT VISION GOGGLES PV7	5
TANK TRANSPORTERS	180
M198 W/PRIME MOVER	950
M1A1 (ADDITIONAL PROD)	3,600

Table C-2. Border Guard Programs

TITLE	UNIT COST
SURV RDAR CTRL SYS BDR GRD	2,400
GROUND RADAR SYS BDR GRD	2,400

Table C-3. Navy Programs

TITLE	UNIT COST
DIESEL SUBMARINES	360,000
POCKET SUBS (MINI SUBS)	180,000
SUBMARINE TENDER (HUNLEY)	552,000
CHINESE ASW CRAFT	36,000
MEDIUM MSL LAUNCHING BOAT	254,400
ARTILLERY ARMED BOAT	2,080
MINE SWEEPER	15,000
COASTAL MINE HUNTER	24,000
MEDIUM MINE HUNTER	36,000
MEDIUM AUX VESSEL (VULCAN)	438,000
AEROSTAT	28,800
SH-60B SEA HAWK	33,840
SH-60F SEA HAWK	25,000
SH-2 SEA SPRITE	25,200
SH-3 SEA KING	6,960
PBC (PATROL BOAT)	21,600
UTILITY BOAT, 22-FOOT	90
TROOP TRANSPORT (LST 1179)	174,000
LST	168,000
FLEX 300	24,000
HARPOON MISSILES	1,440
MK48 TORPEDOS	1,735

Table C-4. Air Defense Programs

TITLE	UNIT COST
HAWK BDES (24 LNCHRS+MSLS)	36,000
HAWK BDES (30 LNCHRS+MSLS)	40,000
HAWK LAUNCHERS (NEW)	360
HAWK MISSILES (NEW)	300
HAWK GS DEPOT	54,000
PATRIOT LAUNCHERS	2,640
PATRIOT MISSILES	900
3-DIMENSIONAL RADAR(TPS70)	12,600
2-DIMENSIONAL RADAR(TPS59)	32,400
PASSIVE RADAR	300
DECOY EMMITER/TRANSMITTER	120
STINGER MISSILES	70
STINGER MISSILES (RMP)	84
VULCAN GUN SYSTEM	900

Table C-5. Air Force Programs

TITLE	UNIT COST
APACHE W/O HELLFIRE	18,000
UH-60 BLACKHAWKS	12,000
UH-60 BLACKHAWKS WITH TOW	15,600
MD-500 TRAINING HELO	1,800
EF-111 RAVEN	56,400
E-2C HAWKEYE	87,600
E-3 AWACS	480,000
F-4E UPGRADE	6,000
F-4G (ANTI-AD AIRCRAFT)	34,200
F-16 C/D	30,600
F/A-18	36,000
C-130s	39,600
B707 TANKER CONVERSION	44,800
EW PODS	3,600
GUNPOD, GBU 5A	450
T-38 (BASIC & ADV TNG A/C)	5,400
GENERIC RPVS	2,040
BEECH 1900 RECON/COMINT	15,000
ACMI	40,000
EW SIMULATOR	120,000
CBU-87	18
CBU-89	54
HARPOON INTG OF F-16 (R&D)	18,000
PENGUIN MSL ON F-16 (R&D)	18,000
AIM-9M SIDEWINDER	18
AIM-9P3	60
AIM-7E SPARROW	270
AIM 7M SPARROW	180
AGM-65B MAVERICK	84
AGM-65D MAVERICK	150
AGM-65G MAVERICK	170
GBUI-12	60
GBU-10	60
MK 82 (500 lb)	1
MK 82 PARACHUTE BOMB	1
MK 83 (1000 lb)	1
MK 84 (2000 lb)	1
HARM MISSILES	300
AMRAAM MISSILES	890
HELLFIRE MISSILES	35
TRAINING ROUND TGN 65G	130

Table C-6. Derivation of Indirect Personnel Costs from MoD Budget Data

Ministry of Defence Budget Category	Indirect Cost Category	Egyptian Pounds (LE)	Hard Currency (HC)
LOGISTICS & SUPPLY AUTHORITY			
Rations Department			
Rations	Rations	161.700	0.000
Cooking Equipment	Housing	15.900	1.400
Maady Hospital & Training Center	Rations	1.400	0.000
Other Requirements	Housing	4.200	0.000
M.K. Hospital	Rations	0.200	0.000
Ordinance Department			
Clothing & Equipment	Clothing	86.000	0.100
Uniforms	Clothing	15.400	0.000
Musical Equipment	Housing	0.200	0.050
Sporting Tools & Equipment	Housing	0.200	0.000
Equipment & Clothing Repair	Clothing	1.100	0.000
Fire Extinguishers	Housing	1.300	0.000
M.K. Hospital Requirements	Housing	0.300	0.000
Maady Hosp Requirements	Housing	0.500	0.000
Qualification Center Requirements	Housing	0.600	0.000
Aiming Post (Firing Ranges)	Personnel	1.200	0.000
Medical Services Department			
Medical, Chemical Equipment	Medical	14.400	4.600
Maady Hospital Requirements	Medical	5.500	1.400
Training Centers Requirements	Medical	0.700	0.500
External Treatment & Surgical Consultation	Medical	0.500	0.000
Health Affairs Requirements	Housing	0.500	0.400
Medical & Non-Medical Equipment & Clothes	Medical	1.300	0.000
M.K. Hospital Requirements	Medical	2.100	0.300
Miltary Forces	Medical	1.100	1.300
ENGINEERING AUTHORITY			
Major Projects Department			
Carry-over Funding	Bases	2.300	0.000
Military Barracks	Bases	3.100	0.000
Military Institutes	Bases	1.400	0.000
Base Housing	Bases	0.000	0.000
General HQ Divisions Department	Bases	1.800	0.000
Workshop of Production Units	Bases	1.600	0.000
Conscript Centers	Bases	2.600	0.000
Associated Clubs	Bases	1.300	0.000
Administrative Bases and Department	Bases	1.800	0.000
Military Hospitals	Bases	9.300	0.000
New projects	Bases	4.400	0.000
Approved projects	Bases	11.700	0.000
Construction Materials	Bases	12.000	0.900

Table C-6. Derivation of Indirect Personnel Costs from MoD Budget Data (Continued)

Ministry of Defence Budget Category	Indirect Cost Category	Egyptian Pounds (LE)	Hard Currency (HC)
Engineering Department			
Expenditure	Bases	3.400	3.700
Project implementation	Bases	3.300	0.000
Public Works Department			
Maintenance	Bases	16.500	0.000
Consumptions	Bases	6.500	0.000
Military College and Institutes	Personnel	0.000	0.000
Training Centers	Personnel	0.000	0.000
Firing Ranges	Personnel	0.000	0.000
Clubs and Hotels	Housing	0.000	0.000
Electric Networks	Bases	0.000	0.000
Military Hospitals	Medical	0.000	0.000
Frontier Guard	Housing	0.000	0.000
		0.000	0.000
Water Department		0.000	0.000
Other Expenditure	Bases	3.700	0.000
OPERATIONS AUTHORITY			
Navy Forces	Housing	3.900	0.000
Air Forces	Housing	21.700	1.400
Air Defense	Housing	9.400	0.600
Logistics and Supply Authority	Housing	1.100	0.000
Engineering Authority	Housing	12.100	0.100
Signal Department	Housing	3.800	1.300
Weapons and Ammunition Department	Housing	1.100	0.000
Electronic Warfare Department	Housing	0.300	0.000
Reserves	Housing	6.700	0.700
OTHER REQUIREMENTS			
Training Authority	Personnel	3.330	4.290
Moral Affairs Department	Housing	3.650	0.212
Military Colleges and Institutes	Personnel	37.280	3.413
Total Indirect Personnel Costs (Millions)		507.360	26.665
TOTAL MoD Personnel	520,605		

Table C-7. Indirect Personnel Category Cost Summary

Indirect Cost Category	Category Total (LE) M	Per Person (LE)	Category Total (HC) M	Per Person (HC)
Housing	87.450	167.978	6.162	11.836
Rations	163.300	313.674	0.000	0.000
Clothing	102.500	196.886	0.100	0.192
Medical	25.600	49.174	8.100	15.559
Personnel	41.810	80.310	7.703	14.796
Base Support	86.700	166.537	4.600	8.836
Total	507.360	974.558	26.665	51.219

Table C-8. Escalation Rates Used In The Cost Model

	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98
Egyptian Pounds	0.8475	1.0000	1.1800	1.3570	1.4520	1.4956	1.5405	1.5867	1.6343
Personnel Pay	0.8475	1.0000	1.1800	1.3570	1.4520	1.4956	1.5405	1.5867	1.6343
Hard Currency	0.9579	1.0000	1.0440	1.0868	1.1270	1.1676	1.2085	1.2496	1.2921
FMS Funds	0.9579	1.0000	1.0440	1.0868	1.1270	1.1676	1.2085	1.2496	1.2921